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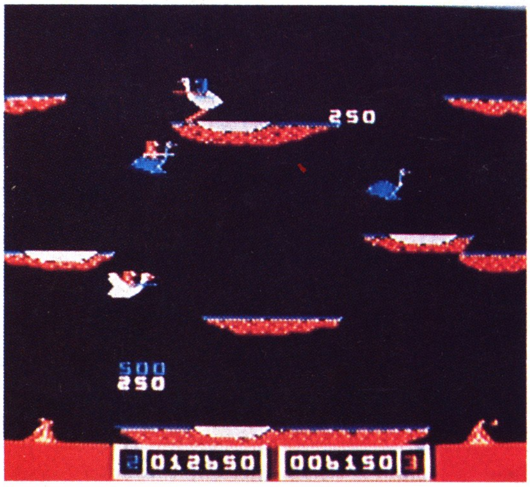
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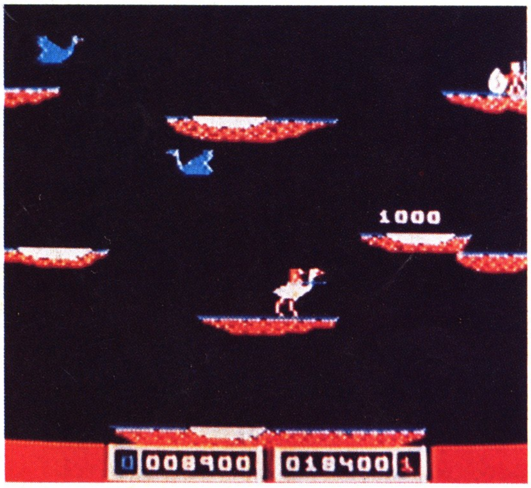
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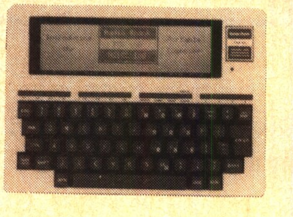
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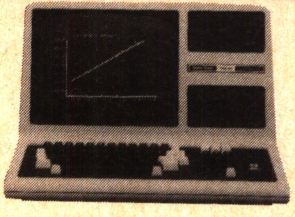
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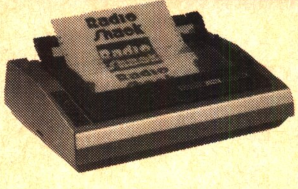
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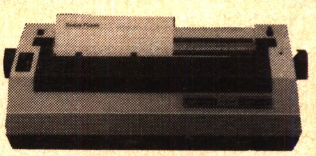
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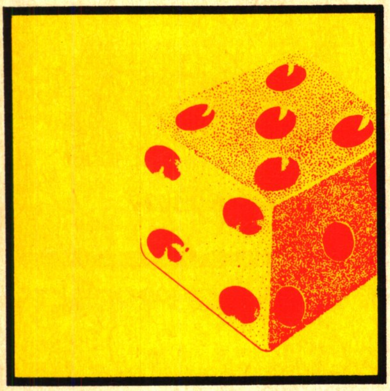
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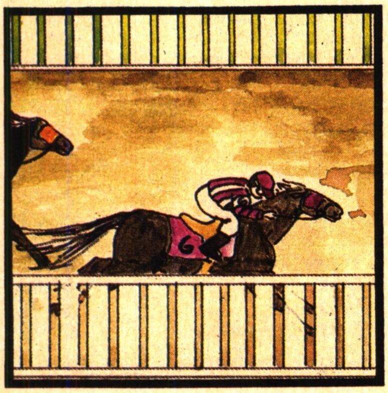
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NEXT MONTH: Our May issue will feature printers and printer capabilities. For instance, we'll have a tutorial on dot graphic printing, a very handy mailing label program, a postcard printing program for your home or business, and a lesson on Spring cleaning your printer heads. And, speaking of Spring cleaning, we'll even have the perfect garage sale program for you!

May will have the usual abundance of the best games, utilities, home helpers and educational programs, plus some three dozen software and hardware reviews — more information on your Color Computer than is available anywhere else!

The RAINBOW

April 1984 Vol. III No. 9

Editor and Publisher
Lawrence C. Falk

Managing Editor James E. Reed
Senior Editor Courtney Noe
Technical Editor Dan Downard
Copy Editor Susan Remini
Submissions Editor Jutta Kapfhammer
Editorial Assistants Valarie Edwards, Wendy Falk, Suzanne Kurowsky, Lynn Miller, Shirley Morgan, Noreen Morrison, Kevin Nickols
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Contributing Editors Bob Albrecht, Steve Blyn, Tony DiStefano, Frank Hogg, Don Inman, Joseph Kolar, Dennis Lewandowski, Tom Nelson, Bill Nolan, Dale Peterson, Michael Plog, Dale Puckett, Fran Saito, Paul Searby, Fred Scerbo, Richard White

Art Director Sally Nichols
Assistant Art Director Jerry McKiernan
Designers Peggy Henry, Neal C. Lauron

Advertising Manager Charlotte Ford
Advertising Assistant Lynda Wilson
(502) 228-4492

General Manager Patricia H. Hirsch
Assistant General Manager for Finance
Donna Shuck
Bookkeeper Diane Moore
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Monica Wheat
Research Assistants Laurie Falk, Wanda Perry, Loretta Varda, Kara Voit
Dispatch Mark Herndon
Production Assistant Melba Smith

Advertising and Marketing Office for the western states and provinces: Cindy Shackleford, director, 12110 Meridian South, Suite 8, P.O. Box 73-578, Puyallup, WA 98373-0578. Phone (206) 848-7766

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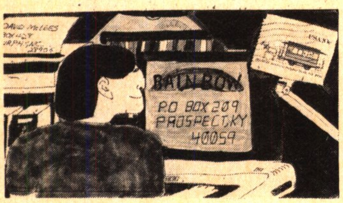
letters to RAINBOW

ARTS AND LETTERS



INFORMATION, PLEASE

Editor:

I know that you have heard these words time and time again, but I really enjoy your magazine and look forward to it every month.

I mustered up the courage to upgrade my 16K Extended CoCo to 64K. Some programs seem to lose color and show black and white. Could this be caused by my upgrading the CoCo?

W. Stokes
Philadelphia, PA

Editor's Note: Try adjusting the clock trimmer capacitor on your board.

FRENCH CONNECTION

Editor:

Could you help me find French CoCo programs? If none are available, how could I obtain the right to translate and duplicate English written programs, so that thousands of French CoCo owners could enjoy them?

A. Lefebvre
St. Michel, Que. Canada

DISK DIFFICULTY

Editor:

I have just bought drive 0 and am having a bad time transferring my tapes to disk. Some ML programs just won't go at all (I have a tape to disk program) and even some of the BASIC programs will not run when put on the disk. Is there any chance you are planning an article for new disk owners, or can you recommend a tape to disk program that really works?

Denis Henderson
Huntsville, Ont. Canada

ASK AND YOU SHALL RECEIVE

Editor:

Do you have any back issue of *the Rainbow* that has a program in it of a slot machine? I have 16K mem but would buy a 64K if I could find a good slot machine game.

Ray H. Merwin
Mt. Vernon, IA

Editors Note: Look no further Ray, and you'll find just what you're looking for in this issue.

HAM INFO

Editor:

In a recent issue of CompuServe's magazine *Today,* I read about Ham Networking with home computers and a receiver. Is there any information anyone has regarding these "Airwave BBS's"?

Craig Stalnaker
Glendale, CA

Editor:

This letter concerns a January 1984 article "A Bigger Byte For BASIC." In the article the author mentions saving ROM packs to disk using the 32K mode. I can't seem to get it to read back from cassette. I am using *CLOADM* "ROM", &HC000, &HDFFF, &HC000 to *CSAVE*, and *CLOAD* also to *READ*. Do you know how to save to disk using this program?

Jack Mesick
Key Colony Beach, FL

Editor's Note: You have to be in the 64K mode before you can reload the ROM packs from cassette.

CHILLY COCO

Editor:

I have a TRS-80 Color Computer, and I keep it in a room where a lot of people go by. I am worried that one day someone will go by and I will find it on the floor.

Well, I have a solution. But I don't know if it would work. The room the computer is in now is 68°-70°. I want to prepare a room in the basement, but the basement is some 20° below what it is up here.

If I move it downstairs, would the sudden cold damage the computer or the hardware attached to the computer? Would the computer get accustomed to the cold? What should I do?

Marc Labbe
Biddeford, ME

Editor:

I really enjoy your magazine. I'm particularly impressed with your "Letters to Rainbow" section. So far you've answered every question that's been asked, but here's a hard one: I'm trying to write a security access system, and the only problem is the [BREAK] key. Do you have some way to override the key?

James C. Hsu
Ripon, WI

Editor's Note: See "Downloads" in the March '84 *Rainbow*.

RUNNER'S REQUEST

Editor:

I am interested in obtaining some information, which I have not seen published in any computer magazine to date.

I own a Radio Shack TRS-80 16K CoCo which I will upgrade to 64K eventually.

I would like to obtain some running-related software that is compatible with my system. For example, I'd like a daily running log, which keeps track of mileage, comments, etc., with an ongoing file to cassette. Also a program that will set up a training schedule, and again keep track of the results on an open file to cassette, and print results to a serial printer.

I would greatly appreciate any info you could give me, or refer me to other sources. My address is: 714 15th Ave. SW, Apt. #17, T2R-0R6, Alberta.

Chris Lisztes
Calgary, Canada

BULLETIN BOARD SYSTEMS

Editor:

Please put my BBS number in your magazine. It is on line Monday and Thursday from 6 p.m. to 6 a.m. only. Its purpose is to get CoCo users to learn more on computer subjects and other subjects of common interest. The telephone number is: 1-716-283-8633.

Ken Carpenter
Niagara Falls, NY

Editor:

I would like to announce a 24-hour BBS in Port Arthur, Texas for the TRS-80, 300 Baud. It features downloading, text files and general message base. The telephone number is: 1-409-983-2383.

David Scott
Port Arthur, TX

AN UPTOWN SYSOP

Editor:

There's a new BBS for the CoCo (and others) in New Orleans. "Uptown Dave" is the SYSOP, and he and his staff invite you to call. The number is 1-504-891-2262.

David Durio
New Orleans, LA

Editor:

I would like to take this opportunity to announce the operation of a bulletin board.

The name of the BBS is "CAREERS" and is run out of Dallas, Texas. The supporting hardware includes a 64K CoCo with three disk drives and a 300 Baud Hayes Smartmodem.

This BBS is run 24 hours and its theme is career enhancement through education and information. The number to call is 214-692-0513. The board is sponsored by Elkins Inst. in Dallas, Inc. and is run privately by me.

It would be greatly appreciated if an announcement of this BBS could be made in an upcoming issue of *Rainbow.*

John Novocilsky, Jr.
Dallas, TX

AN INTERESTING SELLING POINT

Editor:

I am writing this in the hope that some of the manufacturers of soft- and hardware read this column to get a feel of consumer needs. Like many other CoCo owners, I have bought programs that came with keyboard overlays. And like many other CoCo owners, I have changed my keyboard to a full stroke type. I bought the *HJL-57.* The full stroke keys make it so much easier to type, but now I cannot use my overlays. Now, I just keep an overlay on standby for quick reference. Granted, it's no big deal, especially if you are familiar with the keys and functions; however, with more programs coming out with the overlays, some new method for labeling keys could be handy, and for me would be a selling point that could persuade me to one product rather than another.

Joey Chevere
Waukegan, IL

KUDOS

Editor

Kids on our block love war games including me. *WarGame* (Nov. 1983 issue) was nothing less than great. We would like to see a war game contest soon.

T.C. Taulli
Monrovia, CA

Editor:

In no other magazine have I found the satisfaction and pleasure I derive from *the Rainbow.* The programs are a pleasure to type into action and seldom do I have errors, but many times there are multitudes of enjoyment.

M.L. Braun
Bellevue, OH

AN ENCORE FOR JOHN

Editor:

I have read, with much interest, the various well-deserved Kudos for John Fraysse, a fine programmer and gentleman of Virginia. I, too, look forward to more of his programs. Your readers should know that Mr. Fraysse has programs on the market through Tom Mix and DSL. If they enjoyed *Roach* and *Marathon,* they would probably also like *Air Traffic Controller, Space Shuttle,* and *Solo Pool,* by Tom Mix and an educational program, *Speller,* by DSL. If you want an excellent program, then get one or more of these to enjoy while John prepares his next submission.

R.E. Jackson
Knoxville, TN

THANKFUL BEGINNER

Editor:

I enjoyed the Beginners Issue of Jan. '84. I have a 16K CoCo and you helped me getting into the usage of my CoCo. Please give us more of the general information on how to get more out of our CoCo.

Andrew D. Gloster
Santa Maria, CA

GAMES, GAMES, GAMES

Editor:

I would like some information on solving the chromasette adventures *Blacard's Castle* and *Treasure Island.* Specifically, I would like to know; In *Blacard's Castle:* where the sword is and how to get out/into the castle; and in *Treasure Island*: where the treasure is and what to do to get off the oil rig.

Rogers George IV
Terrace, MN

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POOH ON PLUGH

Editor:

My name is Harry Lee Perkins, III and I'm 16 years old. I think your magazine is the best CoCo magazine there is.

About a week ago I wrote a letter to Tandy Corporation in Fort Worth, Texas. I asked them where the Mummy's Treasure Chest (in *Pyramid* by Radio Shack) was at in the *Maze*. Today (Jan. 19) I received a phone call from Fort Worth. I was told how to get the Mummy's Treasure Chest. I was also informed that PLUGH does nothing on the Color Computer. PLUGH only works on the Model 3. Anyone wishing to know how to find the Mummy's Treasure Chest can write to 1450 Picadilly St. Also send a self-addressed stamped envelope (SASE).

Harry L. Perkins, III
Norfolk, VA

Editor:

Does anybody out there know how to get past the spiked pit or the Gargoyle in *Raakatu*? How many objects are there outside of the temple? Also, where can I find the poisonous candle?

For those of you trying to find your way out of the ship in *Beyond The Cimeeon Moon* — use the crosses on the floor as elevators. Green crosses allow you to go down, blue ones allow you to go up. On the level that you start out on, the cross goes both up and down. Also, the disks are used to open the locked doors. If anyone knows how to get past the trap door on the third level, please let me know.

If anyone can help me with any of my questions please send the information to: RR2 Box 137, 57103.

Robert Lee
Sioux Falls, SD

Editor:

On the game *Marathon*, the person who got the top score in the February '84 issue should look in the December '83 issue under "Corrections" on Page 334!

David Dean
West Mansfield, OH

Editor:

I love Adventure games but I'm sure that they would be a lot more fun if I could sometimes figure one or two of them out. But of all of them I have now, I can't solve one of them. If anyone can help me on *Pyramid, Bedlam, Calixto Island, Black Sanctum*, or *Sands of Egypt*, I would appreciate it greatly. Please send the whole solution if possible. My address is 7976 W. 114 Terr., 66210.

Kyle Keller
Overland Park, KS

MODEM PAL

Editor:

I have a modem and would like to know if anyone in the Evansville, Ind., area needs a "modem pal." You see, my modem and I are very lonely. I am a 14-year-old high school freshman. My number is 812-422-8565.

Chuck Alvey
Evansville, IN

THE MC-10 EXCHANGE

Editor:

As an owner of the MC-10, I am interested in contacting other users to exchange programs, ideas, and applications. My address is 2915 Baseline Rd., Apt. 220, 80303. I can also be reached at (303) 444-4437 after 2 p.m.

Jim Robinson
Boulder, CO

HINTS AND TIPS

Editor:

Concerning the "Spell It Out" article in your January issue, Page 169, I had trouble assembling the program with my *EDTASM+* and finally discovered that if, when assembling the program, you will use the "AO" (absolute origin) mode, it works okay. I have a 16K machine and I kept getting a "Bad Memory" Error.

Thanks for a great magazine, keep up the good work.

John McMillian, Jr.
Merryville, LA

Editor:

For readers that have Radio Shack's *Graphic Pac*, there is a small problem of drawing a circle in the EDIT mode. If you draw a circle for a logo or the like, you will end up with the radius line in the finished circle. This is not very useful if you are printing for a finished product. I found if you draw a circle and then draw a separate line over the radius line, and change the color to EX.(3), the background color. You now have a circle to use without unwanted lines.

Michael Hoyt
Apple Valley, CA

Editor:

In response to Paul Wylie's question in the January '84 issue of *Rainbow* regarding the appropriate poke (i.e., XMIT RATE) for 96 Baud to get his Olivetti Praxis 41 typewriter/ printer working, he should do the following: First, *POKE* a XMIT rate of 570; this should give a Baud rate of about 96. Since his typewriter/ printer probably operates within a narrow range centered on 96 Baud, he should then reduce the value of the pokes in increments of one until the typewriter/ printer no longer operates properly. Use the last lowest poke value that allowed the typewriter/ printer to operate properly. This poke value should allow the typewriter/ printer to operate at its highest Baud rate, hopefully slightly higher than 96 Baud (from my experience probably 98 Baud). Good luck.

Clint Cox
Cincinnati, OH

DRAGON CONVERSION

Editor:

A couple of days ago I bought a program made for the Dragon 32 and I thought that would run on my Color Computer. To my extreme disappointment, this program, *El Diablero*, hung up after showing the title and describing the location.

After a couple of sleepless nights of disassembling I found where the program got stuck and replaced the instruction (by comparing Dragon's BASIC ROM with my CoCo's BASIC ROM).

So, to make the Dragon 32 version of *El Diablero* run on Color Computer, do this after *CLOADing*: *POKE &H278C,&HA3* and *POKE &H278D,&H93*. This changes the JSR $B5C9 instruction at $278B-$278D to a JSR $A393. After doing this, *EXECute* and the program will work correctly.

If anyone has similar experiences in converting programs from the Dragon 32 to the Color Computer (or vice versa), would you please write to *the Rainbow*, or directly to me. My address is Eljaksentie 5A, 00370 Helsinki, 37.

Timo Talasmaa
Helsinki, Finland

Editor:

Here is a tip you might want to pass on to your readers. In your June 1983 issue (Page 247), Steve Good published a wonderful program called *SPOOLER* but I could not get it to work with my new disk drive (1.1 Disk ROM). After awhile I realized that the new ROMs have a different location for both the IRQ vector and the Disk BASIC print routine (console out). The best way to get those new locations is to ask our best friend (CoCo itself). So if you are not sure of those locations use the following commands; to get the IRQ vector use *PRINT HEX$ (PEEK(&H010D));HEX$(PEEK(&H010E))*. I got D8AF so I changed Steve Good's line 480 to JMP $D8AF. For the *PRINT* routine I used *PRINT HEX$(PEEK(&H0168)); HEX$(PEEK(&H0169))*. This time I got CC1C so I changed Steve Good's line 640 to JMP $CC1C. Having a 1200 Baud printer I also changed Steve's line 170 to LDA #$29 to avoid doing a *POKE 150,41* each time I wanted to use the program.

Jacques Labonte
Quebec, Canada

BOUQUETS AND BRICKBATS

Editor:

I would like to commend one of your advertisers, Custom Software Engineering, Inc., of Cocoa Beach Florida. After reading the reviews on *Disk Double Entry* in *the Rainbow*, I purchased a copy. However, I found it to be unsuitable for my needs. True to their advertisement, they refunded the purchase price without hesitation. Perhaps if more software vendors would follow their lead, the problem of pirated software could be reduced. The purchaser of software should have the opportunity to see the program in operation before purchasing; but as most items are available only via mail order, it is difficult to see a demonstration prior to purchase. Again a big hurrah for Custom Software Engineering.

Jack O. Hall, Jr.
Bowling Green, KY

Editor:

I was highly impressed by a recent purchase of Spectrum Projects 64K chips. I'm the kind of person who usually fumbles the easiest of electronic projects, but not this

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June 15, 1984

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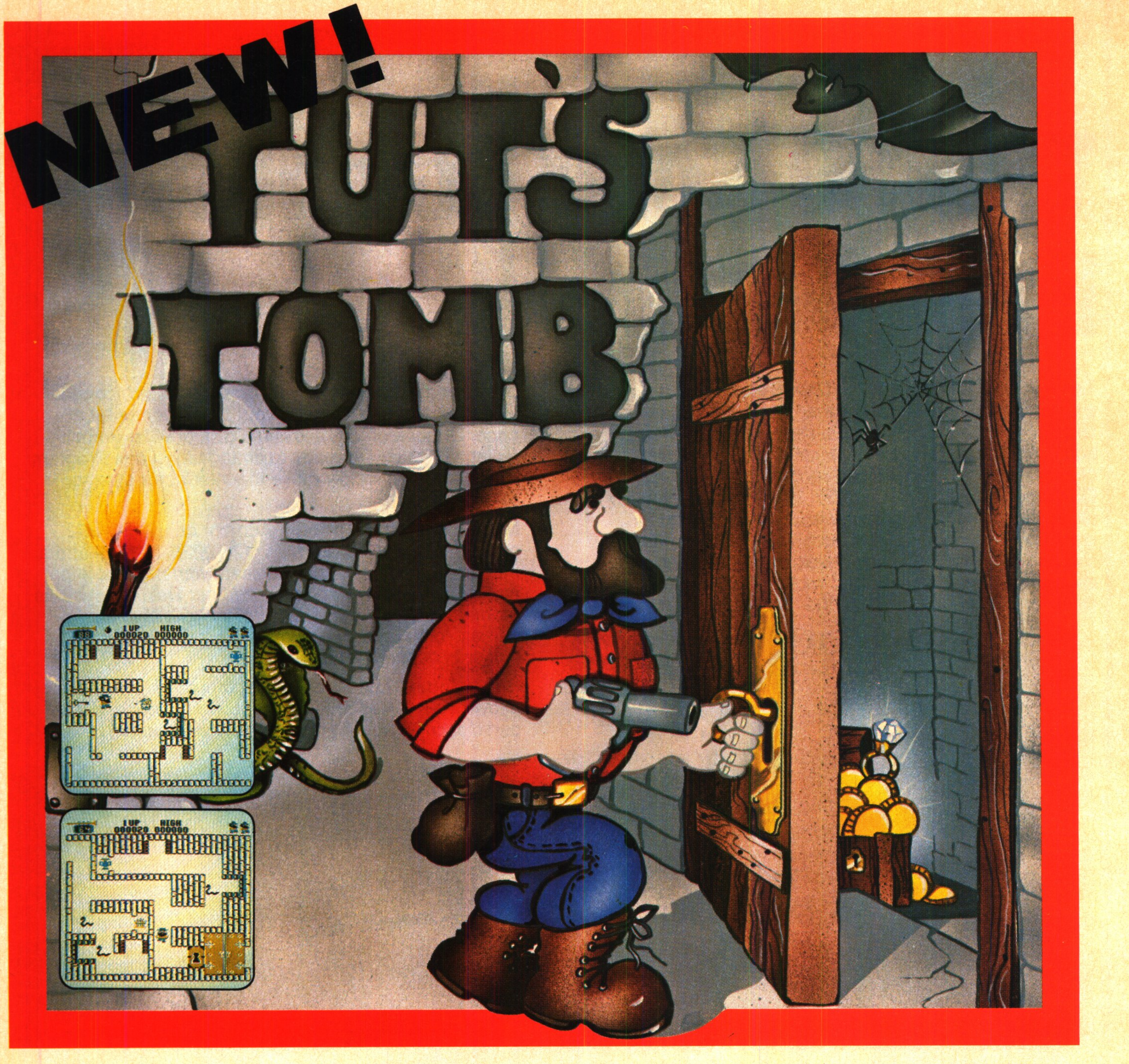

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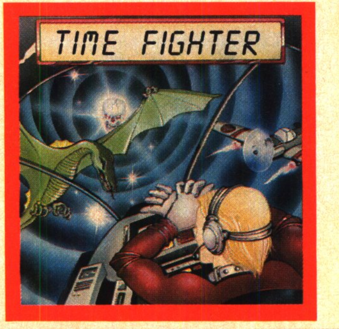

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time! The instructions were very clear and made the job so easy. Of course, I have to give credit to the newest Radio Shack "F" board which is very easy to work with, but I am most impressed with the service I received through Spectrum Projects. The chips arrived within a week of mail order purchase. If I decide to do any further hardware purchases, I definitely know where to go.

David Damico
Alexandria, LA

THREE HOOTS FOR THE OWL

Editor:

Based on your November 1983 review, I purchased *Label III* from Owls Nest Software in Ooltewah, Tenn. As a beginner with a CoCo and a Gemini-10 supported by a cassette, I found the program easy to use and very worthwhile.

I could not, however, get the program to print in certain modes without dropping a letter. The program was not useful unless I could get it to work. I called Norman Shelton, the software writer and owner of Owls Nest. He expressed regret and offered to attempt to get it to work with my system. After Mr. Shelton prepared at least two updates, wrote two letters, and made three long distance phone calls, the program works.

I believe that people, who conduct business the way Norman Shelton did with me, need to be recognized.

Apparently, my problem was that the printer buffer was not prepared to receive data after a return signal. Another label program, purchased from a different software company had a similar problem. In this case, however, the company offered no help. If anyone has a solution, write me at 5 Aspen Drive, 07930.

Adding my name to many others, I find *the Rainbow* most helpful each month.

Luther Bigby
Chester, NJ

Editor:

In going over my just-arrived February *Rainbow*, I noticed in the "Reviews" section a letter from J.G. Hardy of Md., a note of appreciation for EVS Engineering, and their prompt response in providing their new *CC-DBM/LW* program.

I had the same quick response in ordering it, and found it to be exactly as advertised, (and more, actually), but I ran into a problem with it. The program kept dumping all my records when it reached a certain point. A letter to EVS explaining my problem brought unexpected results.

Charlie Krautblatt called by phone and talked to me for about 20 minutes trying to find the problem. We didn't locate it, but he suggested some other things for me to try. I responded with a second letter, and he returned with another 30-minute call, at which time we worked together on our respective computers. The problem still wasn't solved, until the next day I discovered I was making an error in the entry method (I'm not as perfect as I thought I was!) . . . and since then the program has worked perfectly!

There was no fault in the program, but I was impressed with Charlie's interest in perfecting a possibly faulty program, and the time and expense he invested to make me a happy customer. It's great knowing that *somebody* out there cares about their product!

R.G. Miller
Brainerd, MN

CLUBS

Editor:

There are a few changes to be made to our club listing in your magazine (Penn-Jersey Color Computer Club). In your February '84 issue, our BBS number was misprinted. It should be (215) 253-1236. The gentleman at the incorrect phone number was very understanding.

See you at RAINBOWfest in New Brunswick.

Jerry Behler
Allentown, PA

Editor:

We would like to inform readers that a TRS-80/TDP100 Color Computer Club is now being formed in Salinas, Calif. We need more members very much. For further information contact me at (408) 422-9475.

Larry Livingston
Salinas, CA

Editor:

Anyone in the Athens, Georgia area who is interested in visiting or joining a Color Computer Club there is a group that meets the first and third Tuesday at 7:30 p.m. in Room 381 of the Science Library at the University of Georgia. If you need more information you can write to me at Route 2, Box 165, or simply come to the meetings.

Robert Hendrix
Watkinsville, GA

Editor:

We are a growing, non-profit club which currently consists of approximately 125 members. We meet on the first Tuesday night of each month at Dysan Corporation (the ones that make diskettes) in Santa Clara, California. Meeting times are from 7:30-10 p.m. Santa Clara is located in the San Francisco Bay area next to San Jose. The purpose of our club is to promote information exchange between Color Computer owners. Our members own computers which range from 4K to 16K, cassette to multi-disk. Some of our members are just learning how to progam in BASIC, while others are proficient in FORTH, PASCAL, and Assembly language. Our club has both book and software libraries (non-copyrighted software), that are available for local members to check out. We also publish a small newsletter that has CoCo pokes, rumors, hints, and articles. A list of current members' addresses and telephone numbers is included regularly.

Club membership cost is as follows: A one time joining fee of $5 and a membership fee of either $12 yearly . . . or $6 per each six month period.

If you would like to join our club and receive our newsletter, then please make checks payable to: Silicon Valley Color Computer Club. Thank you for your interest!

Shawn Jipp
Sunnyvale, CA 94088

RAVING REVIEW

Editor:

Yes, this is another raving review for your super magazine. Of all the magazines available for the CoCo, yours stands head and shoulders above the others. The quality of the material is far superior to the others. And, as others have already stated, this subscriber consumes it from cover to cover and eagerly anticipates the next issue.

Thank you again for your excellent magazine.

J.T. Minger
Jonesboro, GA

HUCKLEBERRY COMPUTERIST

Editor:

I am looking for CoCo users in the Bergen County area. My address is 553 Huckleberry Lane, 07417.

Joel Makowsky
Franklin Lakes, NJ

Editor:

I'd like to start or join a users group in the Stockton, San Joaquin Valley. Anyone interested can call me at (209) 951-3938 or write: P.O. Box 99024, 95209.

Also, keep up the good work at *the Rainbow*. It's a wealth of information for such a low price!

Steven Paul Moreno
Stockton, CA

Editor:

I would like to hear from anyone in this area interested in forming a CoCo User's Group. Please call me at (203) 795-6211 or write to me at 320 Old Silo Road, 06477.

James J. Pino
Orange, CT

Editor:

We are proud to announce the formation of The South Cook County Color Computer Club in Chicago, Ill. Our meetings include tutorials in BASIC OS-9 and machine language, product reviews, demonstrations of new hardware, etc. The meetings are held in Dalton Public Library once a month. For more information contact Tim Powers, (312) 747-7062, 1633 Fifth Ave., Chicago Heights, 60411. President David Smith.

Tim Powers
Chicago, IL

LETTERS TO THE EDITOR are always welcome. Please keep them short if possible and we will try to answer some of the questions in this column. Others may be left open for solutions by other users. In order to make space for as many letters as possible, we reserve the right to edit submissions.

Letters can be sent to *the RAINBOW*, P.O. Box 209, Prospect, KY 40059.

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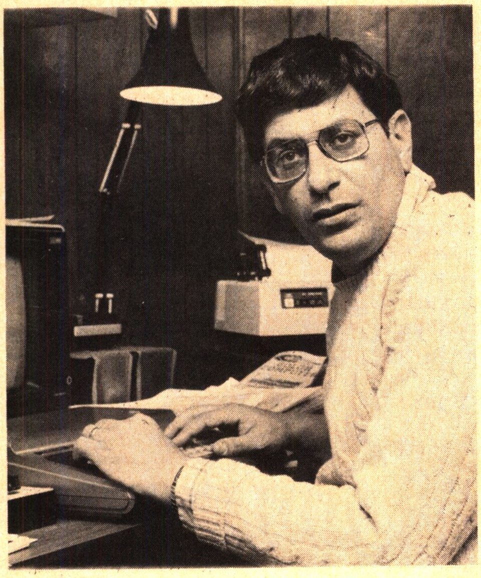

What a wonderful, enthusiastic, happy weekend! **RAINBOWfest** in Long Beach was a super success from all points — attendance was over 8,300, the seminars were just super, all exhibitors had a great time and — as a bonus — Bob Albrecht, our keynote speaker Saturday, celebrated his birthday with us.

It was a great outpouring of the CoCo Community! And people came from all over — San Francisco, the LA area, San Diego, Sacramento, Fresno, Washington State, Oregon, Nevada, Arizona, Utah and a number of CoCoists from Canada, too. Farthest south was a CoCo owner from the Republic of Panama; farthest east: two gentlemen from England.

It was just a super, super weekend! And, we're gearing up now to do it again in New Brunswick, N.J. (and, later, in Chicago). To think: A year ago I could number the CoCo Community members I had met on the fingers of my hand. Now, I've had the good fortune to meet so many of you! And, I can't wait to see so many more of you in New Brunswick.

That's what I consider to be one of the nicest things about **RAINBOWfest** — the opportunity to meet people. I do hope that every one of you will take out just a moment from the exhibits, the seminars, our CoCo Community Breakfast and the rest to just say "hello."

I hope you noticed the new feature that we started in last month's issue and that we are asking you to help us keep moving along. It is called "Rainbow Wishing Well" and is by Fred Scerbo, who, to my mind, is one of the most talented BASIC programmers to ever walk down the pike. That Fred has consented to handle this feature for us is a real plus for *the Rainbow,* and for you, too.

Essentially, "Rainbow Wishing Well" is kind of like the old TV show that was called "You Asked For It." In that show, people wrote in asking the producers to show them certain things on TV and the producers went out and filmed — or dug up old films of — those things.

"Rainbow Wishing Well" is going to be a lot like that. What we're asking you to do is to give Fred some ideas for programs that you would like to see. We'll sift through them and Fred will write them. And we'll print them in *the Rainbow*.

I read a lot of computer magazines, but I have never seen a feature of this sort offered by anyone. Yes, I have seen columnists ask for ideas of "things you'd like to see," but never a feature completely devoted to your requests.

Probably one of the reasons we have not seen one before is because very few people in this world are as talented as Fred Scerbo. I have been fortunate to have known and worked with Fred for more than a couple of years now, and I have enjoyed every minute of it. That he is willing to offer this "You Asked For It" feature in *the Rainbow* is a real plus for all of us. I am certain you will enjoy "Rainbow Wishing Well" and invite you to make suggestions to Fred.

It seems like we are always up to something around here, and the last month has been no exception. We just opened up a west coast advertising and marketing office in Puyallup, Wash., which is a suburb of Tacoma. You'll be able to find the address and telephone number of the new office on the masthead.

Cindy Shackleford heads the office, which will be responsible for our advertising sales and marketing activities in the western states and provinces. Please do not call or write the office for anything pertaining to subscriptions, as that will only delay your getting a response. But, if you are interested in advertising a program or other product you have written, and you live in the western U.S. or Canada, then please contact our new office.

The office's responsibilities also involve dealer sales contacts, marketing of Rainbow Books and **RAINBOWfest** activities. So, if you are interested in any of these areas as well, please contact Cindy.

And, while on the subject, advertisers and potential advertisers east of the Mississippi River are urged to use our advertising representative, Jack Garland of Garland Associates, in Duxbury, Mass. Jack handles only advertising — so dealers and those interested in **RAINBOWfests** should continue to call or write our main office.

Why a west coast office and/or an advertising representative? For one thing, the job became just too massive for us to handle here. And, for another, while most contact must, of necessity, be by letter and telephone, we *do* try to make personal contacts as much as possible. While we're lucky to be situated in the middle part of the country, we do think it to our advantage to have people closer at hand who can call on advertisers personally whenever possible.

(continued on Page 194)

Telewriter-64™

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- **3 display formats: 51/64/85 columns × 24 lines**
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THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

> *...one of the best programs for the Color Computer I have seen...*
> — Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

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File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette autoretry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

Editing features: Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

Insert or delete text anywhere on the screen without changing "modes." This fast "free-form" editor provides maximum ease of use. Everything you do appears immediately on the screen in front of you. Commands require only a single key or a single key plus CLEAR.

> *...truly a state of the art word processor... outstanding in every respect.*
> — The RAINBOW, Jan. 1982

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Telewriter-64 costs $49.95 on cassette, $59.95 on disk, and comes complete with over 70 pages of well-written documentation. (The step-by-step tutorial will have your writing with Telewriter-64 in a matter of minutes.)

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(Add $2 for shipping. Californians add 6% state tax. Allow 2 weeks for personal checks. Send self-addressed stamped envelope for Telewriter reviews from CCN, RAINBOW, 80-Micro, 80-U.S. Telewriter owners; send SASE or call for information on upgrading to Telewriter-64. Telewriter-compatible spelling checker (Spell 'n Fix) and Smart Terminal program (Colorcom/E) also available. Call or write for more information.)

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16/32K cas $26.95 disk $28.95.

QUIZ ALL
A versatile quiz program. Has study and test formats and allows printing of quiz. Even includes an option for the computer to generate multiple choice answers!
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BUILDING APRIL'S RAINBOW

Our Electronic Gambler Issue . . .
A New Series on Women and the CoCo . . .
Plus, 'Little E' and 'Icing on the Cake' . . .

Though the moment is ever so fleeting, the eyes and ears of the world turn toward Louisville on the first Saturday in May each year for what has been called the most exciting two minutes in sports, the annual Run for the Roses, the Kentucky Derby. It's a magic time for Louisvillians; for many of us it's like the carnival has come to town. We call the crescendo of activity which builds throughout April "Derby Fever."

Yes, Louisville is the home of the Kentucky Derby; it's always held at world-famed Churchill Downs. Yet, the cast of players is drawn from around the world, from the fancy high rollers in the plush "Millionaire's Row" section to the college-age Frisbie players in the track infield, they come from all over. And, when it's all over, when the fever has broken and a new thoroughbred champion wears the Derby crown, the carnival crowd moves on, the same cast of thousands never to assemble again.

Oh, there'll be a new crowd next year and, at a glance, it'll seem much the same as last year's. There'll be a new crop of colts — and perhaps even a filly — to vie for horsedom's most coveted crown. And the home folks will have developed no immunity to Derby Fever; the excitement will reach epidemic proportions, for we cherish the tradition that surrounds the Kentucky Derby. In this hustle-bustle world, few things remain as unchanged as the Kentucky Derby.

Though the old ways die hard in Kentucky, the forces of change are irrepressible. On a balmy, 73-degree Sunday afternoon in mid-February, with the front doors propped open to let the promise of spring sweep through the office, we ruminated on the recollection that this very site where *the Rainbow* is now produced was just a short while ago Bluegrass pastureland. Where playful colts once got their "first legs" awkwardly loping along at mother's side, where Derby hopefuls were born and raised, we now have one of the largest computer magazines in the world, the Rainbow.

Building *the Rainbow*, in a way, is like hosting the Kentucky Derby. *The Rainbow* comes together here in Prospect, a few miles down the road from the Derby site, but it's the people from all over that provide the broad spectrum that is *the Rainbow* each month. This month we've assembled the CoCo community's gambling crowd: computer handicappers, system players, card counters and even a shifty-eyed blackjack dealer.

As Senior Editor Courtney Noe puts it in one of his carefully crafted titles, welcome to, the "Casino CoCo." In addition to "A Day at the Races," we have games such as *Roulette* and the *Wheel of Fortune*. You can go for broke playing *Craps* against Mr. Big or you can run your own game with a *Bingo* program that even prints its own cards and markers. You can court Lady Luck with *Home Slot Machine* or you can create your own house odds with *Paribet*, which is not a game at all, but a serious parimutuel wagering program.

As always, our favorite across-the-board combination is the *field*, our *Rainbow* columnists, definitely an odds-on bet, but if you're playing a hunch, first check our reviews, including *Harness/Thoroughbred Handicapper*, a serious bettor's survival plan, and *Horse Race*, a game that relies on plain old "horse sense."

April's *Rainbow* is not all a gambler's gambol. Dr. Sam Sherrill introduces us to color computer based survey research. In "Little E," H. Allen Curtis creates an edit command for those without Extended BASIC. Susan Davis begins a special series on Women and the Color Computer while Eric W. Tilenius' Adventure writing tutorial series on "how to get more Adventure in every byte" ends with "The Icing on the Cake." Our Adventure contest deadline is May 1.

So, welcome to the Casino CoCo and, pssst, here's a hot tip: If you're still gambling on finding *the Rainbow* at your corner newsstand each month, we'd like to tout the advantages of a subscription, it's a sure thing to give you the winningest place in the show!

— Jim Reed

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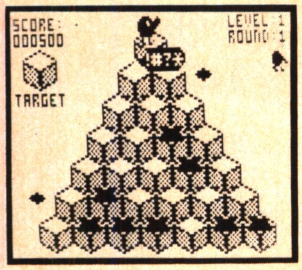

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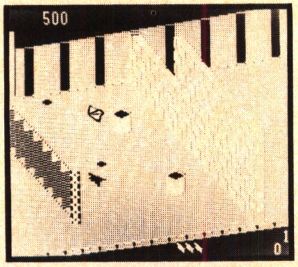

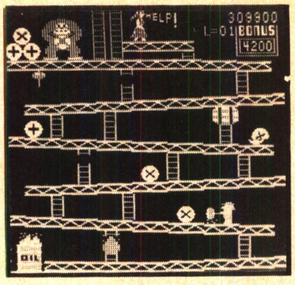

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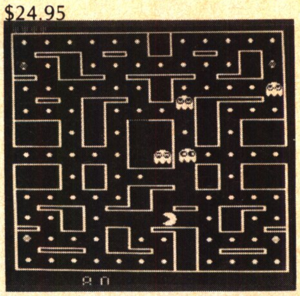

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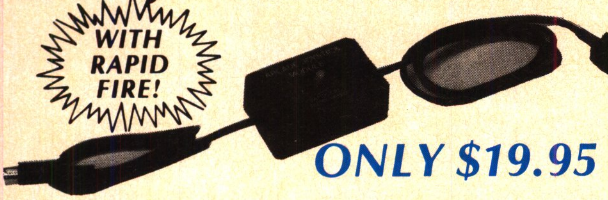

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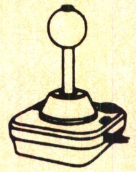

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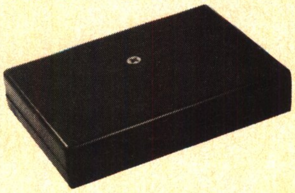

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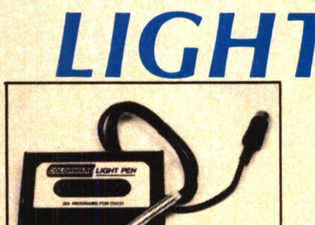

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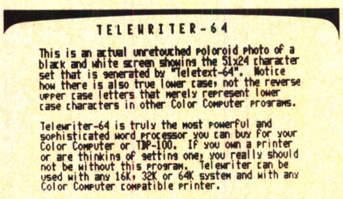

TELEWRITER-64

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The Feasibility of Color Computer-Based Survey Research

Affordable survey data collection and analysis is possible for the small company with a Color Computer and the right software.

By Sam Sherrill, Ph.D.

With the proper software, a microcomputer makes modest-to-medium size survey research projects financially feasible for small organizations that could not otherwise afford this kind of research. Small companies could conduct their own market research among current and potential customers. Small governmental and private, non-profit social service agencies could evaluate their own policies and programs using data from surveys they conducted among their own clients. (Organizations can pool their limited resources to jointly conduct a survey of common interest.)

Survey research is now financially feasible for these organizations because the software developed for the Color Computer drastically reduces the cost for gathering, storing, processing, and analyzing survey data. The use of the Color Computer to store, process, and analyze data is hardly novel; however, using it to collect data via sample surveys is new. We can call this "MASUR," Microcomputer-Assisted Survey Research (equivalent to CATI, Computer-Assisted Telephone Interviewing).

Understanding how the Color Computer can be used in survey research requires a basic understanding of how surveys are conducted. A typical survey consists of the following seven distinct though overlapping steps:

1) identifying project objectives
2) designing the sample
3) writing the questionnaire
4) conducting interviews
5) data processing
6) data analysis
7) reporting project findings

Steps 2 through 7 are bundled together and offered as a package by organizations specializing in survey research. Sponsors of surveys determine the objectives of the project, identify the population to be sampled, and approve the content of the questionnaire. They rarely write their own questionnaires, do their own interviewing, data processing, or write their own reports on study findings. Sponsors pay the research organizations — in most cases, substantial amounts — to carry out these steps.

Interviewing, data processing, and data analysis together typically account for the largest share of the total project budget. Thus, when survey research is purchased as a package, the sponsor participates least in those project steps that account for the bulk of the project cost.

The Color Computer allows organizations to do their own interviewing and data processing. Interviewing can be done with a questionnaire written and run as a program. Data processing is done with separate programs that place the data from each interview into a single file and then prints the results on the screen and to a printer. Thus, small organizations that cannot otherwise afford survey projects can conduct their own in-house, selectively using the help of outside consultants to design the sample, write the questionnaire, train interviewers, and analyze the data. In effect, the Color Computer "unbundles" survey research, allowing each organization to do as much or as little of a survey as they have the time, personnel, equipment, and interest to do. The more that organizations are willing to do in-house, the less they must pay others to do for them.

Questionnaires

Open-ended and closed-ended questions are used in surveys. The difference between these types is important in

(Dr. Sherrill is on the faculty of the school of planning at the University of Cincinnati. He teaches courses in survey research, evaluation research, statistics and economics.)

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Color Computer-based interviewing. A closed-ended question requires the respondent to simply pick an answer (usually just one, and question design must provide for single choices) from a set of answers matched with the question. Answers can be as simple as "yes" or "no" or more involved as in the selection of a particular income range from a set of given income ranges that includes the respondent's own income. Numerical response codes are selected in advance for the answers to closed-ended questions; for example, "1" could be used to represent "yes" and "5" to represent "no." Non-response codes must be available for respondents who cannot answer a question because they do not know the answer, who refuse to answer (not uncommon for questions on income), or those for whom the question is inappropriate. The following codes are an example:

(1) Yes
(5) No
(7) Don't Know (DK)
(8) Refusal
(9) Inappropriate

By contrast, open-ended questions give each respondent the opportunity to answer in his or her own words; there are no preselected answers. For example, respondents might be asked to express their opinions on the quality of goods they purchased from a company or the quality of assistance they received from a social service agency. Since open-ended responses cannot be accurately predicted in advance, numerical codes cannot be selected to represent specific answers.

With current software, interviewers will have to manually record answers with pencil and paper. Later, these responses can be examined and grouped by similar content. Once grouped, numerical codes can be selected and assigned to each group and the new codes entered where they belong in the survey data set. (Entry of text responses directly into the computer is certainly possible, but was not tried for the first survey.) A standard numerical code was entered for each open-ended question to advance the program to the next question (open-ended questions still require non-response codes). Replacing the code number used to advance the questionnaire program with the new codes requires a small editing program which was written (or it can be done with the ASCII option in *Telewriter* or other word processor).

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Numerical responses to open-ended questions (on age or family income, for example) can be entered directly, just as response codes are entered for closed-ended questions. However, tabulations of numerical responses must be grouped by intervals to make the results readable. The interviewing program can be made to select the group code number for questions requiring a numerical response.

Interviewing

Questionnaires filled out by respondents in a survey are self-administered. Interviewers can administer a questionnaire either in person or by telephone. Personal interviewing is the most expensive of the three ways to administer a questionnaire and, for this reason, is not often used. The quality of the responses from self-administered questionnaires tends to be very uneven; people will answer some questions, but not others, and will often answer questions out of sequence. In addition, self-administered questionnaires are generally mailed to respondents. Only about one out of five typically return completed forms. The appeal of this method is that it is the cheapest of the three.

Telephone interviewing is probably the most common way to administer a questionnaire. This method tends to produce responses about equal to the high quality of personal interviews, but at a much lower cost per completed interview. Though more expensive than self-administered questionnaires, telephone interviews produce results of much higher and more even quality.

The Color Computer can be used in either personal or telephone interviewing or to self-administer a questionnaire. The only realistic way to use the machine to self-administer a questionnaire is to set up interviewing stations in convenient locations so that respondents can enter their answers directly into the machine as each question appears on the screen. This might work at a gathering of respondents, such as a professional convention, but would not work when the respondents are geographically spread out. (Though the responses on questionnaires returned by mail could be entered and saved using an interviewing program, more efficient ways to record the data could be devised.)

Radio Shack's Model 100 could be used in personal interviews. Questions would appear one by one on the machine's liquid crystal display: the interviewer would then enter the respondent's answer in the form of a numerical code (e.g., "1" for "yes," "5" for "no"). After the interview is over, the interviewer could quickly save the data on a cassette and then move on to the next respondent. The data would remain in the machine until the end of the interviewing day, backed up by cassette copies. At the conclusion of each day's work, the interviewer would send the data accumulated in the machine over the telephone (via the Model 100's built-in modem) to a central place where all interview data are being collected. Only a careful comparison of costs can establish whether the Model 100 is a more efficient choice than the standard paper questionnaires ordinarily used in personal interviews. The Model 100, with a maximum memory of 32K, costs about $1,000 per machine, certainly far more than the cost per paper questionnaire. However, data written on a paper questionnaire must be converted to a computer-usable form, an expensive and time-consuming task inevitably containing human error that must be corrected. By contrast, since data recorded in the Model 100 are in computer usable form, no conversion is needed and no human errors must be corrected. The savings in time and money might more than offset the leasing or purchase cost of these machines.

The Color Computer and the Model 100 are used essentially the same way to conduct interviews. Once the respondent has been reached by telephone, the interviewer asks each question as it appears on the screen. The interviewer enters the appropriate codes as answers and the machine records this information in computer-usable form. The entire body of survey data is immediately available for analysis at the conclusion of interviews; no coding and keypunching or direct entry of data from questionnaires is required. Survey projects take less time and less money and can be done by any organization having access to a Color Computer, someone to write the questionnaire as a program, and someone to conduct the interviews.

Data Processing

Using the Color Computer with one disk drive, each respondent's answers can be saved on a diskette as a separate file. Each of the separate files will occupy one granule on the diskette as long as each file is not more than 2304 bytes long. Each diskette can hold a maximum of 68 completed interviews. Storing this many interviews on one diskette is not prudent unless backup copies are made each time another completed interview is added. All the data would be lost if the diskette was damaged or lost, and the interviews would have to be conducted over. Given the low cost of diskettes and the expense of reconducting interviews, the more efficient procedure is to save only about a dozen interviews per diskette. At the end of the day's interviewing, a backup diskette copy and a hard copy can be made of the data collected that day. While the risk of data loss is not eliminated, no more than a dozen could be lost at once. The risk of loss due to directory crashes could be substantially reduced by using a program that copies the directory on another track (two have recently appeared in *the Rainbow*; one uses track 0, the other initializes and uses track 36).

Each of the files saved on diskette consists of numbers generated by the BASIC language interviewing program. For data analysis, a program is needed that will read all of the separate files into a single file (the *APPEND* option in *Telewriter* will merge all these files). Another program is needed to edit these files to correct interviewer mistakes and to replace numerical codes that cause the interviewing program to advance from an open-ended question with the codes for the open-ended responses to that question (*Telewriter* can be used here as well). For example, 1's used to advance the program would have to be replaced with the numerical codes representing the various most frequent answers to the open-ended questions.

A tabulation program is needed to generate frequency distributions for each or all of the questions asked in a survey. A friendly tabulation program should create distributions in both absolute numbers and in percentages (often called straightruns and marginals, respectively). It should allow the user to select response codes for tabulation (for example, the user should be able to eliminate non-response codes). And, it should allow the user to cross-tabulate the answers to one question by the answers to a second question (for example, to see separately how men and women answered one or more questions).

Writing a Questionnaire Program

I recently completed a survey research project for the Comprehensive Sickle Cell Center at Children's Hospital Medical Center in Cincinnati, Ohio. Approximately 100 people tested for sickle cell trait were interviewed by telephone using a questionnaire programmed to run on the Color Computer. Two interviewers were trained to administer the questionnaire and to operate Color Computers; both conducted interviews from their homes on machines I provided. The following points about writing a questionnaire program and related examples are drawn from this study.

After a brief explanation of the purpose of the survey and a statement assuring the respondent that his or her answers will be kept completely confidential, the program should offer the option of beginning the interview, calling back another time, or recording a refusal to be interviewed. If the interview can be conducted, the interview number should be entered next. This number serves as the filename of the interview on the diskette. It is also stored as the first number of an array used to store all the numbers generated in each interview. A *GOSUB* statement is used in each question to send the program to a one-line subroutine that stores all numerical responses in the array. (At the end of the interview, this array is read to the diskette.) Care should be taken that the interview number is used only once, otherwise the second of two interviews using the same number will be read

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over the first one on the diskette.

Though the content varies, the form of the following question can be used for closed-ended questions throughout a questionnaire program.

```
230 CLS : PRINT“Q.4/ THINKING IN TERMS OF
    A PERSON'S HEALTH, WOULD YOU SAY
    THAT HAVING SICKLE CELL TRAIT IS:”
235 PRINT“(1) A VERY SERIOUS HEALTH PROB-
    LEM”
240 PRINT“(2) A SOMEWHAT SERIOUS HEALTH
    PROBLEM”
245 PRINT“(3) NOT A VERY SERIOUS HEALTH
    PROBLEM
250 PRINT“(4) NOT A SERIOUS HEALTH PROB-
    LEM AT ALL”
255 PRINT“(7) DON'T KNOW”
260 PRINT“(8) REFUSAL TO ANSWER”
265 PRINT@416,“ENTER CODE HERE”;: INPUT A
270 IF A=>1 AND A=<4 THEN GOSUB 3850
    :GOTO310
280 IF A=7 OR A=8 THEN GOSUB 3850 :GOTO310
290 PRINT@416,“YOU HAVE USED AN ILLEGAL
    CODE FOR THIS QUESTION”
300 PRINT“PLEASE RE-ENTER USING LEGAL
    CODE.” : INPUT A :GOTO270
310 (next question)

3850 V(N)=A :N=N+1 :RETURN
```

Line 230 prints the question. Lines 235 through 260 print the response options and their respective codes; 1 through 4 are the response codes and 7 and 8 are non-response codes. The program pauses at line 265 for the interviewer to enter the appropriate code. Lines 270 and 280 check for valid entries, 1 to 4, 7 and 8 and sends the program to line 3850 to insert valid entries into the array. If an illegal code is entered the program falls through to line 290 where an error message is given and the interviewer is prompted for a reentry. This substantially reduces a source of errors that are expensive to correct after the survey is over. As long as interviewers know to use only integer codes, not decimal codes, there should be no problem. To be foolproof, the following line could be used instead:

```
270 IF A=1 OR A=2 OR A=3 OR A=4 THEN 3850 :
    GOTO 315
```

An open-ended question would be written the same way, the only difference being the use of a single code number (such as “1”), in place of response codes, to advance the questionnaire.

The other major task in writing a questionnaire program is handling skip patterns. In my Sickle Cell project, respondents were asked whether they had returned for counseling after being tested for sickle cell and how they felt about the information they received from the counselors. Respondents' reactions to counseling is an important issue in this study. However, not all respondents returned for counseling. Questions concerning reactions are inappropriate for those who did not return and must be skipped in the interview. Skip patterns can be difficult to follow on paper questionnaires and are often the source of interviewer errors. However, skip patterns can be built in to the questionnaire program, making the interviewers' job easier and eliminating skips as a source of error. The following questions illustrate how skip patterns can be built into the questionnaire program (the pattern is partially presented to save space):

```
2975 CLS:PRINT“Q37/DID YOU RETURN FOR
     COUNSELING AFTER YOU HAD THE SICKLE
     CELL TEST?”
2980 PRINT“(1) YES”
2985 PRINT“(2) NOT SURE”
2990 PRINT“(3) NO”
2995 PRINT“(7) DON'T KNOW”
3000 PRINT“(8) REFUSAL”
3005 PRINT@416,“ENTER CODE HERE”;: INPUT A
3010 IF A=>1 AND A=<3 THEN GOSUB 3850:
     GOTO 3030
3015 IF A=7 OR A=8 THEN GOSUB 3850:GOTO 3030
3020 PRINT@416,“YOU HAVE USED AN ILLEGAL
     CODE FOR THIS QUESTION”
3025 PRINT“PLEASE RE-ENTER USING LEGAL
     CODE.” INPUT A: GOTO 3010
3030 IF A=1 THEN A=9:GOSUB 3850:GOTO 3135
3035 IF A=3 THEN 3045
3040 IF A=2 OR A=7 OR A=8 THEN FOR X=1 TO 3
     :GOSUB 3850 :NEXT :GOTO 3350
3045 CLS:PRINT“Q38/ WHY DID YOU NOT RE-
     TURN FOR COUNSELING?”
.
.
.
3135 CLS:PRINT“Q39/ DO YOU FEEL COUNSEL-
     ING WAS”
3140 PRINT“(1) VERY HELPFUL”
3145 PRINT“(2) SOMEWHAT HELPFUL”
3150 PRINT“(3) NOT VERY HELPFUL”
3155 PRINT“(4) NOT HELPFUL AT ALL”
3160 PRINT“(7) DON'T KNOW”
3165 PRINT“(8) REFUSAL”
3170 PRINT@416,“ENTER CODE HERE”;: INPUT A
.
.
.
3850 V(N)=A :N=N+1 :RETURN
```

If the respondent answered “yes” to question 37 then line 3030 inserts a “9” code (representing “inappropriate,” meaning question 38 is inappropriate for those who did return for counseling) into the V array in line 3850. After the return from 3850, line 3030 then causes the program to skip question 38 and go to question 39. As a general rule, every question must be represented by either a response code, a non-response code, or a code indicating that the question was skipped because it was inappropriate. You can see more clearly now why a tabulation program should allow users to select response codes; non-response and inappropriate codes can be eliminated, leaving only responses for analysis and interpretation.

The ability to write a questionnaire program does not automatically carry with it the ability to compose a questionnaire. Questionnaire construction is a separate endeavor, still much of an art that requires experience to be well done. Those who have never composed a questionnaire before will certainly need experienced help (usually obtainable from a nearby university). Help with sampling may also be needed (again, obtainable from a nearby university). With this assistance and CoCo, it is feasible for small organizations to collect their own data without spending large sums of money.

PICK YOUR NUMBER . . .
'ROUND AND 'ROUND IT GOES . . .

ROULETTE: GOING 'ROUND WITH LADY LUCK

By Gerry Schechter

Gambling game simulations have been popular for a long time on computers. I can recall seeing a primitive blackjack game, on a computer at work, over 10 years ago. Browsing through *the Rainbow,* I have seen ads for several games of this type, which proves that they are still popular.

A while back, I decided to write one of these games. My first effort was a slot machine game, which I sold to T & D Software. I enjoyed writing as well as playing the game, so I thought that I would write another. This time, however, I wanted to write a game that was not available from any of the commercial software firms. I also wanted to take advantage of my recent 32K upgrade.

Roulette is the result of that effort. It is easy to play, and it provides a break from the arcade shoot-'em-up type

(Gerry Schechter has over 10 years of data processing experience. He is currently employed at the New York Hospital, where his responsibilities include the installation and maintenance of software in a large scale IBM mainframe environment.)

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Both shows will be held at Hyatt Regency Hotels which offer special rates for **RAINBOWfest**. Every show will open at 7-10 p.m. Friday, run 10 a.m.-6 p.m. Saturday and close with an 11 a.m.-4 p.m. session Sunday. Each will have a CoCo Community Breakfast featuring an outstanding national speaker from the Color Computer World. And each exhibition will be interspaced with a number of seminar sessions on all aspects of CoCo — from writing in machine language to making your BASIC work better.

But most of all, there will be exhibitors. Lots of them. All ready to demonstrate products of every kind. Some with special programs and hardware items to introduce. Others with show specials.

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My Account # __________ Ex. Date: __________
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RAINBOWfest New Brunswick
Seminar Program And Speakers

Frank Hogg **Advanced Operating Systems**

Frank is the president of Frank Hogg Laboratory and a forerunner in Flex and OS-9 systems.

Steve Blyn **New Trends In Education**

Steve, an award-winning *Rainbow* columnist and teacher, has written many educational programs for Computer Island.

Susan Davis **Women And Computers**

Susan, co-owner of Sugar Software, will lead a panel discussion on women's involvement in the world of the Color Computer.

Gary Davis **Peripherals — Printers, Disk Drives And Modems**

Co-owner of Sugar Software, Gary has been programming for 15 years and specializes in assembly language.

Bob Rosen **Bulletin Boards**

Bob, president of Spectrum Projects, has been running a successful CoCo mail-order business and a bulletin board system for two years.

Dale Puckett **Beginners Tour Of BASIC09/OS-9**

A free-lance writer and programmer, Dale has worked with microprocessors since 1976 and has just completed his first book, *The Official BASIC09 Tour Guide.*

Gordon Monnier **Demonstration On Graphicom**

Gordon is the owner of MichTron (formerly Computer Shack) and has been publishing programs for Radio Shack computers for four years.

Bruce M. Cook **Bringing High Performance Software To The CoCo**

Bruce, an associate with Elite Software, is the author of Elite*Calc and Elite*File.

Frank Thompson and Dan Eastham **Structured Programming In PASCAL**

Frank and Dan, owners and developers of the Colour Software Workbench, will discuss software development tools and PASCAL language — its program structure and relationship in the school environment.

Peter Stark **Introduction To Machine Language Programming For The Beginner**

What Makes The CoCo Different From Other Computers

Peter is a professor of electrical and computer engineering technology in the City University of New York and is president of Star-Kits Software Systems Corp.

Richard R. Parry **Speech Synthesis**

Richard is the founder and owner of Speech Systems and is the designer of music and speech synthesizers.

Fred Scerbo **BASIC Programming And *Coaches' Playbook***

Fred has published some of the first software available for the CoCo through his software firm, Illustrated Memory Banks. Particularly, he will be discussing *The Coaches' Playbook* program for "The Rainbook Wishing Well." See Page 82, March 1984.

PLUS . . . RAINBOWfest's "CoCo Community Breakfast" — Speaker to be announced
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Additional seminars are planned as well. Admission to all seminars is at no charge. See registration form for admission prices to exhibit area and breakfast.

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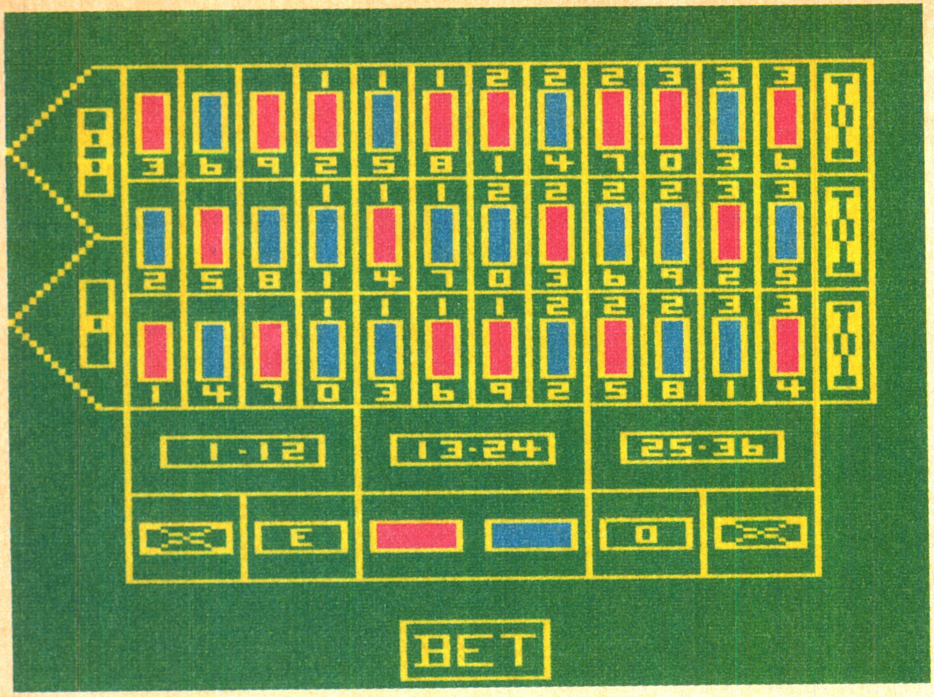

games. While typing it in, you can eliminate all of the comment lines without worrying about UL Errors when you run the program. The first time you run it, you will get an SN Error, unless you [ENTER] *PCLEAR8* from the keyboard.

If you have any problems with this program, or any suggestions on improving it, please feel free to write to me at 75 Midland Terrace, Yonkers, N.Y., 10704. If you don't have the time to type it in, I will send you a free copy if you send me a tape containing a program you have written.

Roulette is played as follows. A large wheel shaped like a dish, containing the numbers 1 through 36, and 0 and 00, is spun. A small ball similar to a marble is spun in the opposite direction of the wheel. Each number has a small notch below it, into which the ball can come to rest.

When you place your bets, you are betting that a particular number or group of numbers will come up on each spin of the wheel.

Each number on the wheel is assigned its numerical equivalent of odd or even, and is also assigned a color which is either red or black. The 0 and 00 are the exception to this rule, and give the house an edge in the odds.

When placing your bets, you have many options. You can bet that a particular number will come up (the highest payoff), or you can bet that the number will be odd. You could also bet the number will be in the range of 1-12, or that it will be in the upper column of numbers (by placing your bet in the upper right-hand corner). In addition, you can bet that the number will be red, or that it will be in the range of 19-36 (by placing your bet in the lower right-hand corner).

There is no limit as to how many bets you can place on each spin of the wheel, and you can even place more than one chip on the same bet. One final word. When placing your bets, your chip must be *exactly* centered (both horizontally and vertically) within the area you wish your bet to be made. This is the only way the program can be sure of the bet you are trying to make.

170	111	1200	91
380	87	1360	116
530	130	1520	245
700	218	1660	128
880	75	1770	168
1050	129	END	107

The listing:

```
1 '   **********************
2 '   ROULETTE  VERSION 1.5
3 '   (C) APRIL 1983
4 '   GERRY SCHECHTER
5 '   75 MIDLAND TERRACE
6 '   YONKERS, NY 10704
7 '   **********************
10 GOTO1840
20 CLEAR200:PMODE3,1:COLOR2,1
30 DIMB(49,3),GP(7,7),N$(9):M=50
0
40 GOSUB650:GOSUB1380:GOSUB570:S
CREEN1,0
50 ' MOVE CHIP
60 X=128:Y=180
70 GET(X-4,Y-4)-(X+4,Y+4),GP:LIN
E(X-4,Y-4)-(X+4,Y+4),PSET,BF
80 PLAY"2":PUT(X-4,Y-4)-(X+4,Y+4
),GP
90 IFY=180THEN120
100 IFPEEK(344)=247THENX=X+4
110 IFPEEK(343)=247THENX=X-4
120 IFPEEK(342)=247THENY=Y+4
130 IFPEEK(341)=247THENY=Y-4
140 IFX<24THENX=24ELSEIFX>232THE
NX=232
150 IFY<32THENY=32ELSEIFY>148AND
Y<>180THENY=148
160 ' CHECK TO DROP CHIP
170 IFPEEK(339)=191THEN190ELSE70
180 ' CHECK TO SPIN
190 IFX=128ANDY=180THEN270
200 ' CHECK PLACEMENT OF CHIP
210 J0=0:FORJ1=0TO49
```

```
220 IFB(J1,1)=X ANDB(J1,2)=Y THE
NJO=1:B(J1,3)=B(J1,3)+1:M=M-1
230 NEXT:IFJO=0THENSOUND50,3:GOT
070
240 ' PUT DOWN CHIP
250 LINE(X-4,Y-4)-(X+4,Y+4),PSET
,BF:SOUND100,2:GOSUB570:GOTO60
260 ' SPIN WHEEL
270 N=RND(38)-2
280 ' DRAW NUMBER
290 D$="":S$=STR$(N):IFN=-1THENS
$="00"ELSEIFN<10THENS$="0"+STR$(
N):IFN=0THEND$="BR4U8R8D8L8":GOT
O320
300 FORZ=2TO3:D$=D$+N$(VAL(MID$(
S$,Z,1)))+"BR4":NEXT:IFN=-1THEN3
20
310 COLORPPOINT(B(N,1),B(N,2)+6)
,1:LINE(66,174)-(90,186),PSET,BF
:COLOR2,1
320 DRAW"BM68,184;"+D$:PLAY"2;2;
4;4;6;6"
330 ' PAYOFF
340 IFN=-1THENN=40
350 IFB(N,3)>0THENM=M+36*B(N,3):
GOSUB570:B(N,3)=0
360 IFN=40THEN500
370 FORX=37TO39
380 IFB(X,3)>0ANDB(X,2)=B(N,2)TH
ENM=M+3*B(X,3):GOSUB570:B(X,3)=0
390 NEXT
400 IFN>0ANDN<13THENIFB(41,3)>0T
HENM=M+3*B(41,3):GOSUB570:B(41,3
)=0
410 IFN>12ANDN<25THENIFB(42,3)>0
THENM=M+3*B(42,3):GOSUB570:B(42,
3)=0
420 IFN>24ANDN<37THENIFB(43,3)>0
THENM=M+3*B(43,3):GOSUB570:B(43,
3)=0
430 IFN>0ANDN<19THENIFB(44,3)>0T
HENM=M+2*B(44,3):GOSUB570:B(44,3
)=0
440 IFN>18ANDN<37THENIFB(49,3)>0
THENM=M+2*B(49,3):GOSUB570:B(49,
3)=0
450 IFN/2=INT(N/2)THENIFB(45,3)>
0THENM=M+2*B(45,3):GOSUB570:B(45
,3)=0
460 IFN/2<>INT(N/2)THENIFB(48,3)
>0THENM=M+2*B(48,3):GOSUB570:B(4
8,3)=0
470 IFPPOINT(B(N,1),B(N,2)+6)=4T
HENIFB(46,3)>0THENM=M+2*B(46,3):
GOSUB570:B(46,3)=0
480 IFPPOINT(B(N,1),B(N,2)+6)=3T
HENIFB(47,3)>0THENM=M+2*B(47,3):
GOSUB570:B(47,3)=0
490 ' REMOVE LOSING BETS
500 FORZ=0TO49:IFB(Z,3)=0THEN530
510 IFZ>0ANDZ<37THENPAINT(B(Z,1)
,B(Z,2)),PPOINT(B(Z,1),B(Z,2)+5)
,1ELSECOLOR1,1:LINE(B(Z,1)-3,B(Z
,2)-3)-(B(Z,1)+4,B(Z,2)+3),PSET,
BF:COLOR2,1
520 SOUND75,3:B(Z,3)=0
530 NEXT
540 IFPEEK(339)<>191THEN540
550 PCOPY5TO1:PCOPY6TO2:PCOPY7TO
3:PCOPY8TO4:GOSUB570:GOTO60
560 ' DRAW $
570 D$="":S$=STR$(INT(M)):IFLEN(
S$)<3THENS$="0"+STR$(INT(M))
580 FORZ=2TOLEN(S$):D$=D$+N$(VAL
(MID$(S$,Z,1)))+"BR4":NEXT
590 COLOR1,1:LINE(152,174)-(224,
186),PSET,BF:COLOR2,1
600 IFM<0THENDRAW"BU6R4"
610 DRAW"BM172,176;L12D4R12D4L12
R4D2U12BR4D12"
620 PLAY"12;11;10;9;8;7":DRAW"BM
180,184"+D$:RETURN
630 ' DRAW TABLE
640 ' LINES
650 PCLS:FORY=16TO112STEP32:LINE
(32,Y)-(240,Y),PSET:NEXT
660 FORX=32TO240STEP16:LINE(X,16
)-(X,112),PSET:NEXT
670 FORX=32TO240STEP64:LINE(X,11
2)-(X,160),PSET:NEXT
680 LINE(32,136)-(224,136),PSET:
LINE(32,160)-(224,160),PSET
690 LINE(64,136)-(64,160),PSET:L
INE(192,136)-(192,160),PSET
700 ' 0 & 00 AREA
710 DRAW"C2;BM32,16;L8G24F24NR8G
24F24R8"
720 ' BOXES
730 FORX=36TO212STEP16:LINE(X,24
)-(X+8,40),PSET,B:LINE(X,56)-(X+
8,72),PSET,B:LINE(X,88)-(X+8,104
),PSET,B:NEXT
740 FORY=20TO84STEP32:LINE(228,Y
)-(236,Y+24),PSET,B:NEXT
```

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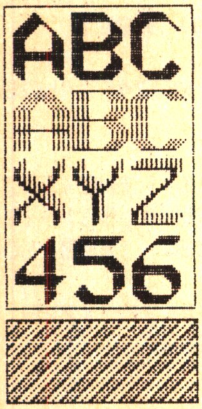

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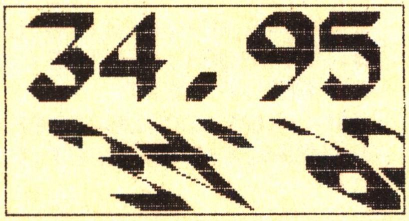

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```
750 FORX=42TO170STEP64:LINE(X,12
0)-(X+44,128),PSET,B:NEXT
760 FORX=36TO196STEP32:LINE(X,14
4)-(X+24,152),PSET,B:NEXT
770 LINE(20,28)-(28,52),PSET,B:L
INE(20,76)-(28,100),PSET,B
780 ' DOTS
790 FORX=64TO192STEP64:PSET(X,12
4):NEXT
800 ' SLASHES
810 LINE(36,144)-(60,152),PSET:L
INE(60,144)-(36,152),PSET:LINE(1
96,152)-(220,144),PSET:LINE(196,
144)-(220,152),PSET
820 FORY=20TO84STEP32:LINE(228,Y
)-(236,Y+24),PSET:LINE(236,Y)-(2
28,Y+24),PSET:NEXT
830 ' RED & BLACK BETS
840 PAINT(112,148),4,2:PAINT(144
,148),3,2
850 ' E & O
860 DRAW"BM82,146;L4D2NR3D2R4BR9
2R4U4L4D4"
870 ' 1 - 12
880 DRAW"BM56,122;D4BR14U4BR6R4D
2L4D2R4"
890 ' 13 - 24
900 DRAW"BM114,122;D4BR6R4U2NL2U
2L4BR12R4D2L4D2R4BR8U2NU2NR2L3U2
"
910 ' 25 - 36
920 DRAW"BM177,122;R4D2L4D2R4BR4
R4U2L4U2R4BR7R4D2NL2D2L4BR8R4U2L
4ND2U2"
930 ' 0 & 00
940 DRAW"BM22,86;D4R4U4L4":DRAW"
BM22,34;D4R4U4L4BD8D4R4U4L4"
950 ' PAINT BOXES & DRAW NUMBERS
960 PAINT(40,96),4,2:DRAW"BM40,1
06;D4"
970 PAINT(40,64),3,2:DRAW"BM38,7
4;R4D2L4D2R4"
980 PAINT(40,32),4,2:DRAW"BM38,4
2;R4D2NL2D2L4"
990 PAINT(56,96),3,2:DRAW"BM54,1
06;D2R4NU2NR2D2"
1000 PAINT(56,64),4,2:DRAW"BM58,
74;L4D2R4D2L4"
1010 PAINT(56,32),3,2:DRAW"BM54,
42;D4R4U2L4"
1020 PAINT(72,96),4,2:DRAW"BM70,
106;R4D4"
1030 PAINT(72,64),3,2:DRAW"BM70,
74;R4D2L4NU2D2R4U2"
1040 PAINT(72,32),4,2:DRAW"BM74,
44;L4U2R4D4"
1050 PAINT(88,96),3,2:DRAW"BM88,
82;D4BD20L2D4R4U4L2"
1060 PAINT(88,64),3,2:DRAW"BM88,
50;D4BD20D4"
```

```
1070 PAINT(88,32),4,2:DRAW"BM88,
18;D4BD20L2R4D2L4D2R4"
1080 PAINT(104,96),3,2:DRAW"BM10
4,82;D4BD20L2R4D2NL2D2L4"
1090 PAINT(104,64),4,2:DRAW"BM10
4,50;D4BD20BL2D2R4NU2NR2D2"
1100 PAINT(104,32),3,2:DRAW"BM10
4,18;D4BD20R2L4D2R4D2L4"
1110 PAINT(120,96),4,2:DRAW"BM12
0,82;D4BD20BL2D4R4U2L2"
1120 PAINT(120,64),3,2:DRAW"BM12
0,50;D4BD20BL2R4D4"
1130 PAINT(120,32),4,2:DRAW"BM12
0,18;D4BD20L2D4R4U2NL4U2L2"
1140 PAINT(136,96),4,2:DRAW"BM13
6,82;D4BD20L2D2R4ND2U2"
1150 PAINT(136,64),3,2:DRAW"BM13
4,50;R4D2L4D2R4BD20L4D4R4U4"
1160 PAINT(136,32),4,2:DRAW"BM13
4,18;R4D2L4D2R4BD20BL2D4"
1170 PAINT(152,96),3,2:DRAW"BM15
0,82;R4D2L4D2R4BD20NL4D2L4D2R4"
1180 PAINT(152,64),4,2:DRAW"BM15
0,50;R4D2L4D2R4BD20NL4D2NL2D2L4"
1190 PAINT(152,32),3,2:DRAW"BM15
0,18;R4D2L4D2R4BD20BL4D2R4NU2NR2
D2"
1200 PAINT(168,96),4,2:DRAW"BM16
6,82;R4D2L4D2R4BD20BL2R2L4D2R4D2
L4"
1210 PAINT(168,64),3,2:DRAW"BM16
6,50;R4D2L4D2R4BD20BL4D4R4U2L4"
1220 PAINT(168,32),4,2:DRAW"BM16
6,18;R4D2L4D2R4BD20NL4D4"
1230 PAINT(184,96),3,2:DRAW"BM18
2,82;R4D2L4D2R4BD20L4D4R4U2NL4U2
"

1240 PAINT(184,64),3,2:DRAW"BM18
2,50;R4D2L4D2R4BD20L4D2R4NU2D2"
1250 PAINT(184,32),4,2:DRAW"BM18
2,18;R4D2NL2D2L4BD20D4R4U4L4"
1260 PAINT(200,96),3,2:DRAW"BM19
8,82;R4D2NL2D2L4BD20BR2D4"
1270 PAINT(200,64),4,2:DRAW"BM19
8,50;R4D2NL2D2L4BD20R4D2L4D2R4"
1280 PAINT(200,32),3,2:DRAW"BM19
8,18;R4D2NL2D2L4BD20R4D2NL2D2L4"
1290 PAINT(216,96),4,2:DRAW"BM21
4,82;R4D2NL2D2L4BD20D2R4NU2NR2D2
"

1300 PAINT(216,64),3,2:DRAW"BM21
4,50;R4D2NL2D2L4BD20NR4D2R4D2L4"
1310 PAINT(216,32),4,2:DRAW"BM21
4,18;R4D2NL2D2L4BD20D4R4U2L4"
1320 ' BET BOX
1330 LINE(108,172)-(148,188),PSE
T,B
1340 DRAW"BM112,176;R8D8L8R2U4R6
```

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```
L6U4BR18L8D4R4L4D4R8BR8U8L4R8"
1350 PCOPY1TO5:PCOPY2TO6:PCOPY3T
O7:PCOPY4TO8
1360 RETURN
1370 ' SHOW TABLE
1380 FORX=1TO5:SOUNDRND(200),2:S
CREEN1,1:SOUNDRND(175),2:SCREEN1
,0:NEXT
1390 ' INITIALIZE BET MATRIX
1400 Z=0:FORX=40TO232STEP16:FORY
=96TO32STEP-32
1410 Z=Z+1:B(Z,1)=X:B(Z,2)=Y:NEX
TY,X
1420 FORZ=40TO49:FORX=1TO2:READB
(Z,X):NEXTX,Z
1430 B(0,1)=24:B(0,2)=88
1440 FORZ=0TO49:B(Z,3)=0:NEXT
1450 FORX=0TO9:READN$(X):NEXT
1460 ' INSTRUCTIONS
1470 CLS0:PRINT@38,"WELCOME TO R
OULETTE";
1480 PRINT@195,"DO YOU NEED INST
RUCTIONS?";
1490 I$=INKEY$:IFI$=""THENX=RND(
TIMER):GOTO1490ELSEIFI$="Y"THEN1
500ELSECLS:RETURN
1500 CLS0:PRINT"IN THIS GAME OF
CHANCE, YOU WILLBE BETTING ON TH
E 'BIG WHEEL'.."
1510 PRINT"EACH SPIN OF THE WHEE
L WILL      YIELD A NUMBER, WHICH
 CAN BE ODDOR EVEN, AND RED OR B
LACK EXCEPTFOR ZERO AND DOUBLE Z
ERO."
1520 PRINT"YOU WILL BE BETTING O
N THE       OUTCOME OF EACH SPIN
OF THE      WHEEL."
1530 PRINT"YOU WILL BE GIVEN $50
0 TO START OUT WITH.
1540 PRINT"THIS GAME WILL ONLY A
LLOW        STRAIGHT BETS (E.G. N
O CORNER ORSPLIT BETS."
1550 GOSUB1740:CLS0:PRINT"     --
  PLACING YOUR BET  --":PRINT
1560 PRINT"USE THE ARROW KEYS TO
 MOVE THE  FLASHING CHIP AROUND.
"
1570 PRINT"THE CHIP WILL MOVE IN
 ALL        DIRECTIONS DEPENDING
ON WHICH    ARROW KEYS ARE HELD D
OWN."
1580 PRINT"WHEN THE CHIP IS EXAC
TLY         CENTERED ON THE BET Y
OU WISH TO MAKE, PRESS THE CLEAR
 KEY."
1590 PRINT"EACH CHIP IS WORTH $1
.","YOU MAY PLACE MORE THAN ONE
CHIPON ANY BET."
1600 GOSUB1740:CLS0:PRINTTAB(9)"
-- PAYOFFS --":PRINT
1610 PRINT"STRAIGHT   -  35 TO 1"
,"ALL NUMBERS, 0 & 00"
1620 PRINT"COLUMN     -   2 TO 1"
,"ANY 12 NUMBERS IN COLUMN"
1630 PRINT"DOZEN      -   2 TO 1"
,"1-12, 13-24, 25-36"
1640 PRINT"RED/BLACK -    1 TO 1"
,"COLOR SPUN EQUALS COLOR BET"
1650 PRINT"ODD/EVEN   -   1 TO 1"
,"NUMBER CORRESPONDS TO BET"
1660 PRINT"HALF       -   1 TO 1"
,"1-18 OR 19-36"
1670 GOSUB1740:CLS0:PRINTTAB(6)"
-- MISCELLANEOUS --":PRINT
1680 PRINT"TO SPIN THE WHEEL, PR
ESS THE    CLEAR KEY WHILE IN TH
E BET BOX."
1690 PRINT"THE NUMBER SPUN WILL
APPEAR TO  THE LEFT OF THE BET B
OX."
1700 PRINT"AFTER EACH SPIN, YOUR
 MONEY WILLBE UPDATED, AND ALL L
OSING BETS WILL BE REMOVED FROM
THE BOARD."
1710 PRINT"TO START ANOTHER ROUN
D, PRESS   THE CLEAR KEY.":PRINT
1720 PRINT"GOOD LUCK AND HAVE FU
N..."
1730 GOSUB1740:RETURN
1740 PRINT@483,"HIT <enter> TO C
ONTINUE..";
1750 I$=INKEY$:IFI$<>""THENCLS:R
ETURN
1760 X=RND(TIMER):PRINT@488,"ENT
ER";:GOSUB1830:GOTO1740
1770 DATA 24,40,64,124,128,124,1
92,124,48,148,80,148,112,148,144
,148,176,148,208,148
1780 DATA U8R8D8L8R8,BR4U8D8BR4
1790 DATA R8L8U4R8U4L8BR8BD8,R8U
4L4R4U4L8BR8BD8
1800 DATA BR4U8D4R4L8U4BR8BD8,R8
U4L8U4R8BD8
1810 DATA R8U4L8U4D8BR8,BR8U8L8R
8D8
1820 DATA U8R8D8L8U4R8D4,BR8U8L8
D4R8D4
1830 FORX=1TO70:NEXT:RETURN
1840 PCLEAR8
1850 ' DRAW LOGO
1860 PMODE3,5:PCLS:COLOR2
1870 DRAW"BM32,44;U20R16D12L16R8
F8BR8U20R16D20L16BR24U20D20R16U2
0BR8D20R16BR8R16L16U10NR12U10R16
BR8R16L8D20BR24U20L8R16BR8R16L16
D10NR12D10R16"
1880 PLAY"T32L3201V30":SCREEN1,1
:GOTO20
```

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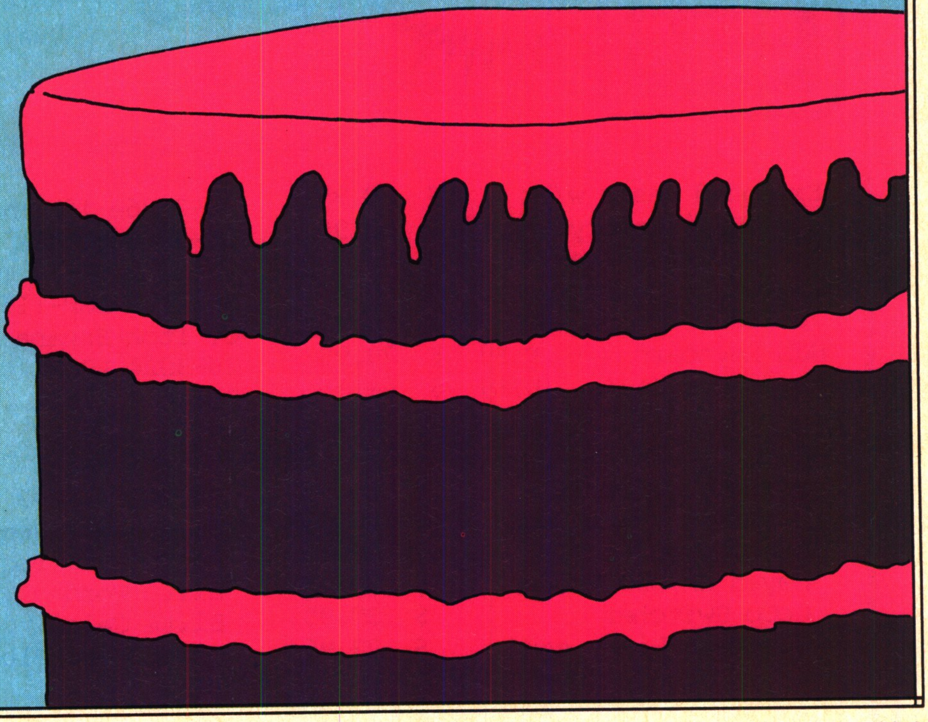
Writing Adventure Programs, Part III

The Icing On The Cake



By Eric W. Tilenius

In this last of my three articles on Adventure programming techniques, I will show you how you can make your Adventure program very professional looking — perhaps even good enough to be sold by a big software house!

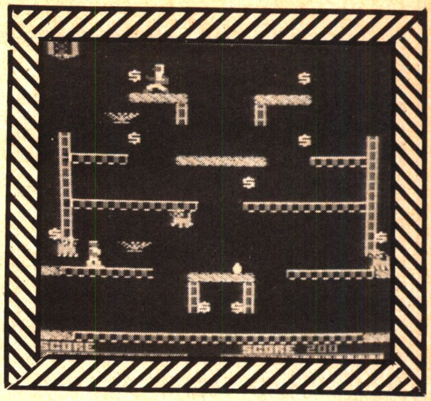
Imagine that you are a judge of the prestigous *Rainbow Adventure Contest* and on your desk is a pile of close to a thousand entries. (Actually you wouldn't have them piled all on your desk at once unless you were some kind of nut, but just suppose for now that they are all there.) You have wearily plodded through about 300 of the entries already and you look tiredly at the stack of 700 Adventures sitting in your "IN" box.

So far, the Adventures you have tried have just been of the same old boring type. You wearily reach for another (hoping your pile doesn't crash to the floor in the meantime) and stuff it into your tape recorder. The program loads and you type *RUN* the same way you have for the last 300 boring times — only this time there is a difference. The Adventure you are playing is enjoyable . . . professional . . . fun . . . and it even has a game save feature (so you can go out for pizza without worrying about someone shutting your computer off). This program has made your day! You mark it "possible winner" and hand it over to another judge for evaluation.

(Eric W. Tilenius is a sophomore at Walt Whitman High School in Huntington, Long Island, New York, and has been programming and working with computers for several years. He is currently serving as an advisor and consultant to people new to the computer field. During his freshman year, Eric was editor of The Stimson Stylus, *a school newspaper.)*

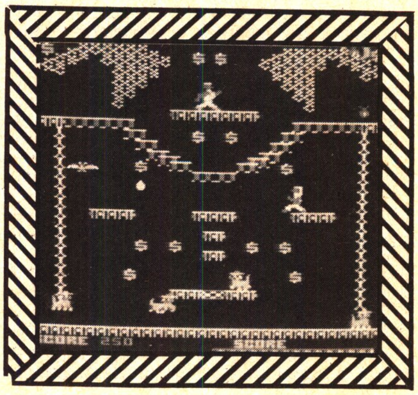
CASHMAN

By Doug Frayer and Bill Dunlevy

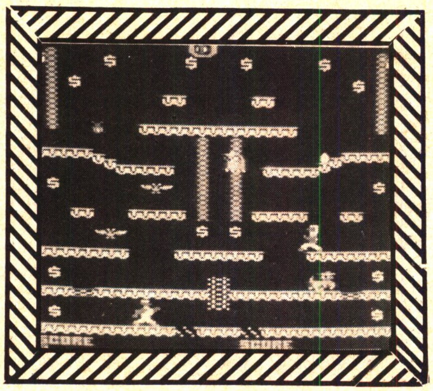


The screen is exploding with colorful, fast moving animation like you've never seen. The speaker is alive with every kind of sound imaginable! Best of all, the player's eyes are glowing with fascination and wonder of this classic creation. THE GAME??? CASHMAN! So colorful, so imaginative, so all out fun, that you'll wonder why you ever settled for anything less!

Dozens of levels and screens (more than FORTY!) let anyone from beginner to expert have as much excitement, challenge, and good clean fun as they can stand! Even the least adept player can have the time of their life with CASHMAN, yet with the increased excitement of special Mystery Pieces and Expert Puzzle Screens, the most experienced arcade addict is guaranteed to never stop playing!!!



Play by yourself or invite the ultimate challenge of simultaneous two player competition! Run along the colorful girders, jump across the tremendous chasms, climb the wobbly ladders, or grab a BYRD and fly to get the loot before your opponent does! Be careful though, KATS are on the prowl and wrestling with them can be a challenge.



CASHMAN's classical play is so original and so much fun that no arcader whether a veteran or a rookie, can afford to pass it up.

So run, jump, climb, or fly to the nearest color computer and play the ultimate . . . CASHMAN! (P.S. CASHMAN lets you play against the computer or play 2 players simultaneously.)

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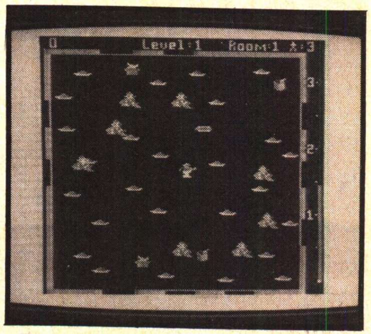
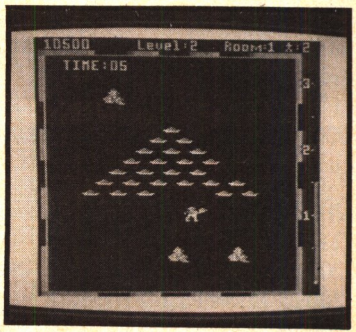
MUDPIES

Mudpies is a rare game, it is not a copy of an arcade game! Mudpies shows you that excellent games are possible on the COCO that are not copied from an arcade game. It has clear bright color and graphics, excellent sound and best of all, it is a lot of fun to play.



A reviewer in Hot CoCo who plays a lot of games says that "Mudpies is my favorite game." I think this says it all. Mudpies is one of our favorite games here at MichTron. It is simply a lot of fun to play. It has many different screens and by constantly moving from one room to the next you never get bored with the game as you do with many games that only have one screen.



The object of the game is to run from room to room in the circus tent picking up mudpies and throwing them at numerous clowns that are chasing you.

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This article will show you how *you* can create the kind of professional Adventure described above. We will explore how to make a game save feature, create creatures that will appear at unannounced moments to help make the Adventurer's life one of danger, randomize the position of objects, create mazes, and get more Adventure in every byte. To top it off, I'll also present a subroutine that will end your woes of having words split when the printing runs off the edge of the screen, as well as some good tips for a winning Adventure. So read on, and discover how to make your Adventure a real *winner*!

Save The Game

One of the most important extras you can put in your Adventure is a game save feature that allows the player to save his current position to tape or disk. Surprisingly, however, only about half of the people who write Adventures include this feature in their games. Adding a game save feature greatly enhances your Adventure, since the player won't have to start at the beginning of the Adventure every time he wants to take a coffee break.

Allowing the player to save his position is not all that difficult a task. All it requires is *PRINTing* to tape or disk the variables which change during the Adventure. These include the current room the Adventurer is in, the locations of the various objects, and the status of obstacles. If you remember, in February's *Rainbow* we used the variable L to represent the current location of the player; O(C) to stand for the room that object number C is in; DOOR to stand for the current status of a door; and ALTAR to represent the status of an altar. If the player types the word “SAVE,” we will now send the computer to a subroutine that will save these variables on tape. If we have line 1100 INPUT” WHAT NOW”;A$ we can send the computer to the subroutine for saving a game by adding line 1102 IF LEFT$(A$,2)=“SA” THEN GOSUB 20000. The following subroutine will take care of the saving.

```
20000 ' GAME SAVE SUBROU-
TINE
20010 INPUT“TAPE OR DISK”;D$
20020 D1$=LEFT$(D$,2)
20030 IF D1$=“TA” THEN D=-1
ELSE IF D1$=“DI” THEN D=1
ELSE 20010
20040 INPUT“FILENAME”;F$
20050 OPEN“O”,D,F$
20060 FOR C=1 TO Y:REM -RE-
PLACE Y WITH THE NUMBER
OF OBJECTS IN YOUR ADVEN-
TURE
20070 PRINT #D,O(C):NEXT C
20080 PRINT #D,DOOR,ALTAR
20090 CLOSE #D:PRINT“FILE
“F$” IS SAVED”
20100 RETURN
```

If the player said he wanted to save to disk, the variable D, which is the device to which the information is to be printed (-1 for cassette or 1 for disk), would be 1. If he chose to save the game to cassette, D would be -1. Line 20050 then *OPENs* the specified device for output (as seen by the “O” which stands for Output) and assigns it whatever filename the player told it to in line 20040. The subroutine then proceeds to *PRINT* to that device the current rooms each object is in (accomplished by lines 20060-20070). Line 20080 then prints the variables representing the status of various obstacles — such as whether a door is closed or open. You can easily add to this line or change it to meet your needs. For example, if you have three obstacles represented by the variables O1,O2,and O3, you would replace line 20080 with 20080 PRINT #D,O1,O2,O3. Line 20090 *CLOSEs* the file and *PRINTs* that the file is saved. Line 20100 then *RETURNs* to the main program. Note: if you just have Color BASIC, you may need to change line 20050 to: 20050 OPEN “O”,#D,F$. This is due to a slightly more restrictive tape filing format in Color BASIC. If you have Extended or Disk BASIC, don't worry about it.

Now that the player is able to save the current game, we obviously should provide him with a way of loading his position and continuing from where he left off; otherwise, saving the game is no good, is it?

The Same Old Game

The Adventure should ask the player at the beginning whether he or she would like to play a previously saved game or not. If the player does, the program asks him for the filename and whether it is on tape or disk. It then proceeds to load in the old game. It is important, however, that this be done *after* the program has read in its *DATA*. I'll say more on this in a minute.

Here is a subroutine that will load back in the game which was saved with the game save subroutine above. When using it in your programs, make any changes in variable names so that you *INPUT* the same variables you *OUTPUT* in the same order; i.e., if you have the game save subroutine *PRINT* to the disk the variables O1, O2, O3 in that order, make sure that in the subroutine listed below you INPUT them in the same order.

```
29999 ' LOAD OLD GAME ROU-
TINE
30000 INPUT“TAPE OR DISK”;D$
30010 D1$=LEFT$(D$,2)
30020 IF D1$=“TA” THEN D=-1
ELSE IF D1$=“DI” THEN D=1
ELSE 30000
30030 INPUT “FILENAME”;F$
30040 OPEN“I”,D,F$
30050 FOR C=1 TO Y: REM
-CHANGE Y TO # OF OBJECTS
30060 INPUT #D,O(C):NEXT C
30070 INPUT #D,DOOR,ALTAR
30080 CLOSE #D:PRINT“ GAME
LOADED. PROCEED TO PLAY.”
30090 RETURN
```

You will notice that in line 30040 we use an “I” in the *OPEN* command instead of an “O.” This opens the file for *INPUT* instead of *OUTPUT*. You will also notice that we changed the PRINT

> “What's an Adventure without spooky monsters, creepy aliens, or some other sort of creature that lurks behind every door with the sole purpose of making the Adventurer's life a dangerous one!”

#D statements to INPUT #D statements. These are about the only major differences between the game save and the game load options. Again, note that if you just have Color BASIC, change line 30040 to read: 30040 OPEN "I",#D,F$.

I mentioned before that you should only call this subroutine *after* the program has read its *DATA*. Otherwise, the data which you inputted with the game load routine would be changed when the computer reads its data. Thus, if you have your *DATA* in lines 100-400 and the statements to *READ* that *DATA* in lines 400-500, ask the player if he wants to continue an old game after line 500, but before the game actually starts. For example:

```
502 INPUT"PLAY PREVIOUS
GAME (Y/N)";P$
504 IF LEFT$(P$,1)="Y" THEN
GOSUB 30000
600 PRINT"LET THE GAME BE-
GIN . . ."
```

If the player doesn't want to play a previous game, the computer goes on to line 600 and *PRINTs* "Let the game begin." If the player does want to load an old game, the computer goes to the game load routine then RETURNs to line 600. From there you can start the actual game (printing room descriptions, asking the player what to do, etc.).

Now that we have all of this laborious work of saving and "unsaving" out of the way let's get down to something more fun. It's time for . . .

Monsters And Mazes

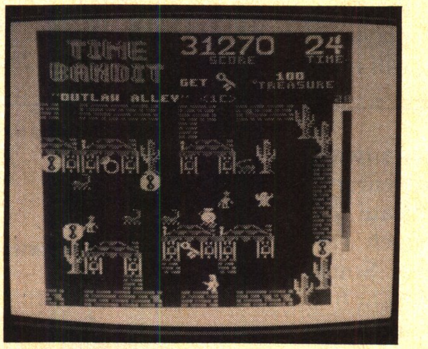
What's an Adventure without spooky monsters, creepy aliens, or some other sort of creature that lurks behind every door with the sole purpose of making the Adventurer's life a dangerous one! Or, what is an Adventure without a maze of twisty, twiny passages? (Personally, I hate getting caught in a maze while playing Adventures, but what can you do?)

There are basically two types of monsters in an Adventure — stationary ones and the kind that move around and show up just when you don't want them to. The stationary ones can be treated just like any other stationary obstacle, except that if you go in their direction you are killed. See my article in February's *Rainbow* to see how to put such an obstacle in. If you missed February's *Rainbow* you can still get it. See "Back Issue Information" in this month's *Rainbow*.

The other type of monster, which will strike at the Adventurer (perhaps scat-

TIME BANDIT

This month is the first month that the entire top ten panel had copies of Time Bandit and they overwhelmingly voted it into first place. Never before has a game received so many first place votes. At the Dallas Rainbowfest and at the Pasadena Color Expo, arcade players were unanimous in the praise of Time Bandit. "The best original game ever written for the COCO" ... "My dad said I could buy only one game and this is the best game here" ... "Best game at the show" ... "Best game I've ever seen on a home computer" ... "Great Game" ... Only game I bought at the show" ... These are comments we heard about Time Bandit at these two shows ... I can say without a doubt that TIME BANDIT is the best game on the market for the COCO.



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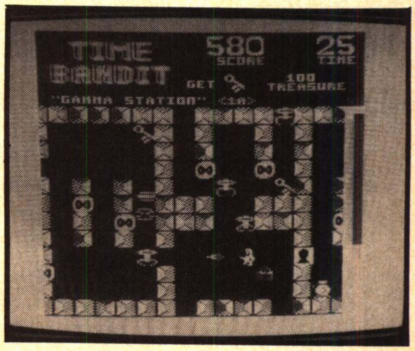

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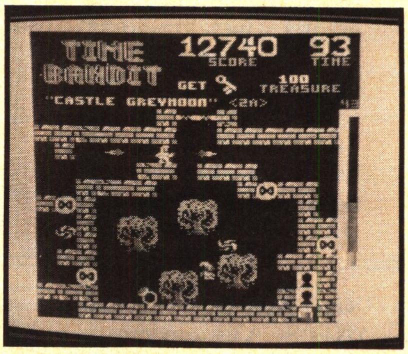

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tering his objects) until something is done to stop it, is not really that hard to put in an Adventure. Have a variable that keeps track of whether the monster has been killed or otherwise taken care of. For example, you could have the variable M equal to 0 if the monster is on the prowl and set it to 1 when the Adventurer effectively disposes of it. The following routine has a monster attack the Adventurer at random intervals and scatter his belongings.

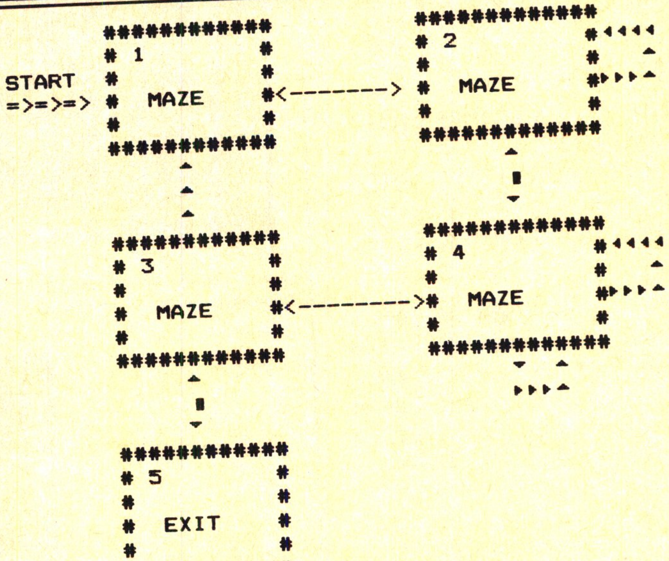

Diagram 1 — A sample of how a maze works in an Adventure. The arrows indicate the direction in which the player may travel. Some passages, like the one between rooms 3 and 1 are one-way passages — the player can go from room 3 to room 1, but not from room 1 into room 3. The arrows which are going out of a room and then back into it indicate that when the player goes in that direction he merely winds up back in the same room.

> "Having the locations of certain objects in an Adventure randomize each time the game is played can be of great value to some Adventures."

```
1080 IF RND(50)=1 AND M=0
THEN PRINT"A BIG UGLY MONSTER JUST CAME AND SCATTERED ALL YOUR EARTHLY
POSSESSIONS": GOTO 1082 ELSE
GOTO 1100
1082 FOR C=1 TO Y: REM -Y=#
OF OBJECTS
1084 IF O(C)=1000 THEN O(C)
=RND(10)
1086 NEXT C
1100 INPUT"WHAT WILL YOU
DO NOW";A$
```

O(C) represents the room that object number C is in. If it is 1000 that means that the Adventurer is carrying it. Thus, in line 1084, if the monster attacks the Adventurer, the computer distributes any objects that he has to one of 10 rooms. Make sure you place the above routine, or any version of it that you create, just after the point in your Adventure where the computer describes the player's surroundings, but before the point where the computer asks the player what he would like to do. This will make sure that the routine is "activated" whenever the player enters a new room.

Now, no Adventurer worth his weight in salt would put up with a humiliation such as having some low-down monster scatter all his earthly possessions. It, therefore, stands to logic that the Adventurer will do something to make the creature wish it had never laid eyes (or whatever it uses instead of eyes) on him. Just what the Adventurer must do to accomplish this, I will leave up to your imagination. Just remember, however, to set the variable you are using to keep track of the monster to 1 when the player manages to defeat the monster.

Now that we can besiege the Adventurer with ferocious monsters, let's get him lost in a maze. Mazes are much simpler to do than most people think. A good maze may only take up three or four rooms, but because of one way passages and passages leading back into the same room, the player gets totally confused. See Diagram 1 to see what I mean.

The above diagram shows how a small maze can easily deceive the Adventurer by giving the illusion of size. This is accomplished by allowing the player to wander endlessly in any direction. For instance, if the player were to go either east or south while in room 4 of the maze, he would still be in room 4. The unwary player will not know that, however, since the program will just tell him "YOU ARE IN A MAZE" in each of the four rooms of the maze, thus leaving him to wonder whether he actually accomplished anything by moving in that direction. Once you have mapped out your maze, you can enter it in the travel table just as you would for any other room. For example, the entries in the travel table for the four rooms of the maze in Diagram 1 would look like this:

```
200 DATA 0,0,2,0: REM DATA FOR
    ROOM 1
210 DATA 0,4,2,1: REM DATA FOR
    ROOM 2
220 DATA 1,5,4,0: REM DATA FOR
    ROOM 3
230 DATA 2,4,4,3: REM DATA FOR
    ROOM 4
```

Remember that the data in the travel table is arranged in the format NORTH, SOUTH, EAST, WEST for each room; NORTH being the room number the player would get to if he went north, etc. A zero represents that the player cannot go in that direction.

Now that you can successfully make an Adventurer go crazy inside a maze, it's time for a little change. In fact, now we get to something that changes *every* game.

Unpredictable Objects

If you have ever played *Madness and the Minotaur* or *Keys of the Wizard,* you know that they randomize the location of objects at the beginning of each game so that you never quite know where an object will turn up. Having the locations of certain objects in an Adventure randomize each time the game is played can be of great value to some Adventures. The technique for doing this is presented here. You, however, must judge whether your Adventure lends itself to having the objects in it randomized.

When we typed in the object data before, you had three entries for each object — the "long object name" (a short description of the object), the "object name" (a one-word name for the object), and then the "object number" (the room which the object is in at the start of the game). To specify that an object should be placed randomly in the Adventure, put a -1 for the object number. For example:

```
300 DATA AN OLD WOODEN BOAT,BOAT,12
310 DATA A HUNTER'S CROSSBOW, CROSSBOW,-1
```

When the computer reads the above data, it will put the boat in room number 12 and the crossbow in room -1. Wait a minute! There is no room -1. Thus, after reading all the object data, we tell the computer to go to a subroutine that will take all the objects in "room -1" and randomly distribute them through the Adventure.

```
700 FOR C=1 TO Y :'REPLACE Y WITH THE # OF OBJECTS IN YOUR ADVENTURE
710 READ LO$(C),O$(C),O(C) : ' THESE LINES READ THE DATA
720 NEXT C:GOSUB 40000
39999 'SUBROUTINE TO RANDOMIZE OBJECTS
40000 FOR C=1 TO Y
40010 IF O(C)=-1 THEN O(C) =
```

INTERCEPT 4

By J. Weaver, Jr.

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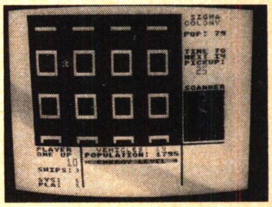
ENERGY LEVEL
SHIPS: 3
SYS: 1
PLA: 1
APPROACHING SIGMA COLONY



Your ship and the planet are under attack. Hostile alien craft whip around the ship, releasing flamming bolts of energy upon the hull of the INTERCEPT. Immediately your own guns come alive, warding off the sudden attackers, but will it be enough? Already many of the fighters have escaped past your ship toward the defenseless colonies below. Once the air battle is over, you must transport down to the planet, try to find the alien foe, and destroy them. Then, the hardest task awaits: using the full power of the INTERCEPT, you must battle and destroy the mother ship!! Three separate screens or levels of play. Each screen scrolls in all four directions. A fantastic new game by the author of Outhouse. Requires two joysticks.

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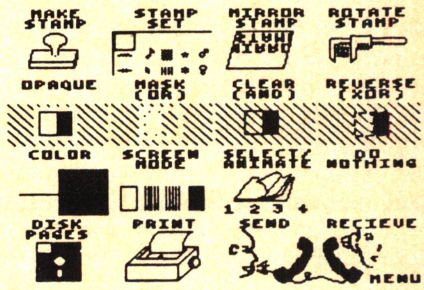

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```
RND(R): 'REPLACE R WITH THE
NUMBER OF ROOMS YOU HAVE
IN YOUR ADVENTURE
40020 NEXT C: RETURN
```

Et voila! The objects which you specified to be randomized are now scattered throughout the Adventure. A little note, however. If you have Extended or Disk BASIC, add the statement X=RND (-TIMER) at the very beginning of your Adventure. This will reseed the random generator so that each time you *RUN* the Adventure you get *truly* unpredictable results. Otherwise, the *RND* command tends to give results that will be predictable after playing the Adventure for a while.

Print It Neatly

Sometimes the *PRINTing* in an Adventure looks rather unprofessional since words get cut in two on the screen as the program goes off the end of one line and on to another. This is not the program's fault per se, but it does look rather messy. The short subroutine below takes care of that problem. It checks to see if a word is cut in two, and if so, fixes the problem. To use it, do the same as you did to use my Graphics Screen Print in March's *Rainbow:* type N$="WHAT YOU WANT TO SAY":GOSUB 50000. This takes the place of a *PRINT* statement, but, of course, you can switch back and forth between the two and use a *PRINT* statement whenever you want to. Feel free to incorporate this subrouine in your program.

> "A good Adventure not only should have good puzzles, but it also should be eye-appealing and *fun* to play"

```
49999 ' NEAT PRINT SUBROU-
TINE BY ERIC TILENIUS
50000 CX$=CHR$(32):LL=32
50008 CL=INT(LEN(N$)/32): CR$=
RIGHT$(N$,CL)
50010 IF LEN(N$)<LL THEN 51000
50020 IF MID$(N$,LL,1)=CX$
THEN 51000
50030 FOR CX=LL TO 1 STEP-1
50040 IF MID$(N$,CX,1)=CX$
THEN CC=CX:GOTO 50060
50050 NEXT CX:GOTO 51000
50060 PRINT LEFT$(N$,CC-1): N$
= MID$(N$,CC+1,LEN(N$)-CC-1)
50070 IF LEN(N$)>32 THEN 50030
51000 PRINT N$:RETURN
```

This subroutine can be used in any type of BASIC program — not just Adventures. Program Listing 1 is a listing of this routine along with a demonstration.

Save Those Memories

Here are a few suggestions for saving memory when typing in your Adventure:

1) Leave out all *REMark* statements and try to put in as few spaces as possible.
2) When typing in your travel table, you may condense it by leaving out the zeros and putting more than one room entry per program line. For example, a travel table looking like this:

```
400 DATA 4,0,0,3
410 DATA 3,1,0,0
420 DATA 0,2,4,1
430 DATA 2,1,0,3
```

may be condensed into one line:

```
400 DATA 4,,,3,3,1,,,,2,4,1,2,1,,3
```

40 119
END 189

The listing:

```
1 '****************************
2 '**NEAT PRINTING SUBROUTINE**
   ****BY ERIC W. TILENIUS*****
   *******JANUARY 1984*********
   ****************************
3 '---THIS SUBROUTINE WILL---
   --ARRANGE YOUR TEXT SO----
   ---THAT NO WORDS ARE------
   ----SPLIT ON THE SCREEN---
--FOLLOW ON SCREEN DIRECTIONS---
10 CLEAR 500
20 CLS4:PRINT"NEAT PRINTING DEMO
":PRINT@128,"DESIGNED TO BE USED
 AFTER        READING THE TUTORIA
L ON ADDING   FINAL TOUCHES TO YO
UR ADVENTURE. TO USE THIS SUBROUT
INE, DELETE   ALL THE LINES UP TO
 49999 AND    THEN FROM YOUR PROG
RAM, HAVE     N$='WHAT YOU
30 PRINT" WANT TO SAY' THEN   TYP
E 'GOSUB 50000' THE SUBROUTINEWIL
L TAKE CARE OF THE REST."
40 PRINT
100 INPUT"PHRASE TO BE PRINTED "
;N$
150 PRINT:PRINT
200 GOSUB 50000
300 PRINT:PRINT:GOTO 100
49999 ' NEAT PRINT SUBROUTINE
        BY...
           ERIC TILENIUS
50000 CX$=CHR$(32):LL=32
50008 CL=INT(LEN(N$)/32):CR$=RIG
HT$(N$,CL)
50010 IF LEN(N$)<LL THEN 51000
50020 IF MID$(N$,LL,1)=CX$ THEN
 51000
50030 FOR CX=LL TO 1 STEP -1
50040 IF MID$(N$,CX,1)=CX$ THEN
CC=CX:GOTO 50060
50050 NEXT CX:GOTO 51000
50060 PRINT LEFT$(N$,CC-1):N$=MI
D$(N$,CC+1,LEN(N$)-CC-1)
50070 IF LEN(N$)>32 THEN 50030
51000 PRINT N$;CR$:RETURN
51001 END
```

This can help save a lot of memory in an Adventure.

3) If you are using Extended BASIC, it is nice to use words as variables, but each character in the variable name takes up memory. The computer only recognizes the first two letters of the variable anyway.

4) Using low line numbers and multiple statement lines saves memory.

5) Leaving out the variable name in the *NEXT* statement of a *FOR . . . NEXT* loop saves both time (the computer can process it faster) and memory. Thus, a loop such as FOR T=1 TO 100:READ L(C):NEXT would be better for time and memory considerations than the loop FOR T=1 TO 100:READ L(T): NEXT T.

Keeping memory considerations in mind will help you to put a lot of Adventure in a little space.

Some Final Tips

Feel free to use any of the techniques, subroutines, etc. in this article to improve your Adventure. A good Adventure not only should have good puzzles, but it also should be eye-appealing and *fun* to play. If the player has to struggle through the Adventure, he is not going to enjoy it as much as he otherwise would. With that in mind, here are some final tips for a good Adventure.

1) Have a large list of verbs which the computer will recognize. It is much more fun for the player if he doesn't have to spend a long time thinking up the right command to use in a situation.

2) Make all puzzles logical. The solution to a puzzle in an Adventure should make sense — even if it isn't something the player would think of right away.

3) Always have title and instructions. Even if you supply good documentation, it is still a nice feature to let the player "type and *RUN*" rather than having to read the instructions on paper.

4) If you are submitting your Adventure to a magazine, always make several saves of it to insure that at least one loads. Have at least one copy in ASCII format. This can be done by typing: CSAVE"PROGRAM",A for cassette or SAVE"PROGRAM",A for disk.

5) Appropriate sound effects enhance the Adventure — but don't overdo it.

So start computing away at your Adventure and make it the *best*! If you are entering *the Rainbow's Adventure Contest*, be sure to get your entry in the mail before May 1. There are loads of great prizes and winning the contest is a very high honor. But whatever you do, good luck and *Happy Adventuring!*

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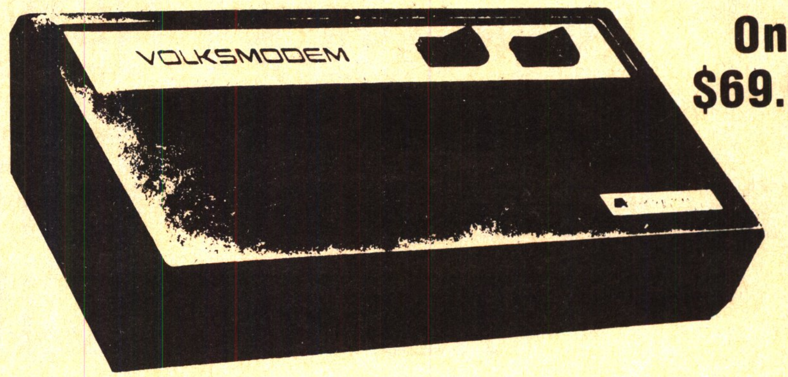

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Finding Areas And Perimeters In Hi-Res

By Steve Blyn
***Rainbow* Contributing Editor**

It is widely acknowledged that the powerful graphic capability of the CoCo is one of its strongest features. We can easily observe this in many of the popular arcade games and in many geometric graphic demonstration programs published in this magazine.

I have enjoyed keying in and learning from several of these geometric simulators. Keying in good programs from magazines is one of the best ways that I have found to learn and teach BASIC programming ideas. By carefully observing exactly what you are typing, you often inadvertently discover the programming techniques used by the author. This type of unexpected learning is often referred to by educators as incidental learning.

My students and I especially enjoyed the program by R.W. Odlin in the December, 1983 issue of *the Rainbow*. This type of program is very entertaining to all, but really only the brighter students can truly abstract and learn the concepts used in such programs.

There are very few available programs that help the average or slow students to learn more about geometric shapes. This is especially sad in light of the strong graphics of our computer. This month's program will help to bring to the average beginner's level the concept of area and perimeter of rectangular objects.

Usually, I am satisfied to publish low resolution programs in this column. They are generally much shorter for the readers to key in and they don't exclude those without Extended BASIC. Although this program could certainly be written in low resolution, I feel that much of the appeal in this case would be lost without high resolution graphics.

Writing this type of program in Hi-Res required drawing all of the letters and numbers needed for display. Several programs previously published in the pages of *the Rainbow* contain such alphabet utilities. It is a good idea to examine and save the ones that you prefer. Then you can append or merge them to your own programs.

Once you have an alphabet and number string set included in your program, you don't have to redraw them each time they are used. Our method is to create them once and to assign a string name to each. Then they can be used over and over again by calling up the string name.

(Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He and his wife, Cheryl, own Computer Island.)

The letter strings are created on lines 180-430. They are done individually by name of letter for you to observe or alter. Lines 450-460 set these strings into an array called R$. This is done to make it easier to manipulate the letters within the program. Lines 470-560 create the numerals 0-9 in an array called N$.

A rectangle is computed and drawn on Lines 650-680. Line 680 ends with the letters BF. This uses two powerful options of the line command. The "B" tells the computer to draw a box and the "F" tells the computer to color it in. Try to do that in one line on almost any other computer: It can't be done!

Lines 690-880 compute and draw the values of the height and base of the rectangle. This is slightly involved because the CHR$ values for the numbers begin at 48 rather than zero. Our N$ values, however, only go from 0 to 9. This problem is solved by having lines 730 and 800 subtract 48 from the true values. SD and SE become the correct values for the height and base on line 880.

The remainder of the program contains many REMs to keep you aware of the various routines used to create the action. First, the perimeter is to be computed by the student. His answer is converted into Hi-Res numerals. Then a correct or a wrong message is given. If incorrect, the correct answer is displayed underneath. The same procedures are then repeated for finding the area of the same rectangle.

This program illustrates techniques used to teach the area and perimeter of rectangles and squares. Squares are really no more than a special form of rectangle. The program, of course, does not cover the entire area and perimeter field. We encourage you to modify this program for other geometric shapes such as triangles, parallelograms, trapezoids and even circles. The ideas employed here would be applicable to other shapes.

We ordinarily do not promote Computer Island products or products from other companies in this column. There is, however, an exceptional product for sale that is worth mentioning here. This product, which comes from Radio Shack, is called *Color Pilot*. It is a relatively easy way to learn high resolution authoring systems. It is ideal for programs such as the one I have illustrated here. Using *Color Pilot*, a similar program could be created using probably 75 percent fewer lines. It is well worth looking into *Color Pilot* at your local Radio Shack Computer Center.

160	65	910	148
450	243	1110	40
510	235	1310	163
700	184	END	35

The listing:

```
10 REM"AREA AND PERIMETER OF SQU
ARES AND RECTANGLES"
20 REM"<C> STEVE BLYN,COMPUTER I
SLAND,NY,1984"
30 PCLS:SCREEN1,1:PMODE3,1:CIRCL
E(130,50),10:PCLS
40 CLEAR 1000
50 GOTO 170:REM"**GO READ THE ST
RINGS FOR THE LETTERS AND NUMBER
S"
60 REM"**DRAW THE OPENING SCREEN
"
70 PCLS:SCREEN1,1:PMODE3,1
80 DRAW"C2S8BM70,50"+A$+R$+E$+A$
90 DRAW"C3S4BM100,75"+A$+N$+D$
100 DRAW"C2S8BM20,110"+P$+E$+R$+
I$+M$+E$+T$+E$+R$
110 DRAW"C4S4BM20,170"+B$+Y$+SP$
+C$+O$+M$+P$+U$+T$+E$+R$:DRAW+SP
$+I$+S$+L$+A$+N$+D$
120 COLOR3:LINE(10,10)-(240,150)
,PSET,B
130 LINE(5,5)-(245,155),PSET,B
140 EN$=INKEY$:FORT=1TO50:NEXTT
150 IF EN$="" THEN 140 ELSE 590
160 REM"***THE PICTURES OF THE N
UMBERS AND LETTERS ARE CONTAINED
 IN STRINGS HERE"
170 DIM R$(26),NN$(6),N$(10)
180 A$="U8R8D4L8BR8D4BR4"
190 B$="U8R6F2D2L8BR8D2G2L6BR12"
200 C$="U8R8BD8L8BR12"
210 D$="U8R6F2D4G2L6BR12"
220 E$="U8R8BD4L8BD4R8BR4"
230 F$="U8R8BD4L8BD4BR12"
240 G$="U8R8BD4L4BR4D4L8BR12"
250 H$="U8BR8D8BU4L8BD4BR12"
260 I$="BU8R8BL4D8BL4R8BR4"
270 J$="U4BU4BR8D8L8BR12"
280 K$="U8BR8G4L4BR4F4BR4"
290 L$="U8BD8R8BR4"
300 M$="U8F4E4D8BR4"
310 N$="U8F8U8BD8BR4"
320 O$="U8R8D8L8BR12"
330 P$="U8R8D4L8BD4BR12"
340 Q$="U8R8D8H4BG4R8BR4"
350 R$="U8R8D4L8BR4F4BR4"
360 S$="BU4U4R8BD4L8BR8D4L8BR12"
370 T$="BU8R8BL4D8BR8"
380 U$="U8BR8D8L8BR12"
390 V$="BU8D4F4E4U4BD8BR4"
400 W$="U8BR8D8H4G4BR12"
410 X$="E8BL8F8BR4"
420 Y$="BU8F4E4BG4D4BR8"
430 Z$="BU8R8G8R8BR4"
440 SP$="BR12"
450 R$(0)=SP$:R$(1)=A$:R$(2)=B$:
R$(3)=C$:R$(4)=D$:R$(5)=E$:R$(6)
=F$:R$(7)=G$:R$(8)=H$:R$(9)=I$:R
$(10)=J$:R$(11)=K$:R$(12)=L$:R$(
13)=M$
460 R$(14)=N$:R$(15)=O$:R$(16)=P
$:R$(17)=Q$:R$(18)=R$:R$(19)=S$:
R$(20)=T$:R$(21)=U$:R$(22)=V$:R$
(23)=W$:R$(24)=X$:R$(25)=Y$:R$(2
6)=Z$
470 N$(0)="BU1U4R3D4L3R3BD1BL10"
480 N$(1)="BE2NU3DEBFBGBL9"
490 N$(2)="BENR3HER3U2L4BG5BL"
500 N$(3)="BENR3HENR2HER3BG5BL5"
```

VIP™
Library

ANNOUNCING The VIP Library™ With a Terrific Sale!

Nelson Software Systems is now Softlaw Corporation, under new management. Our Super "Color" Library programs have also undergone a name change. All programs are the same unbeatable Super "Color" Library programs you've heard so much about, but with new VIP names. To introduce our **VIP Library** we are having a special sale on the following pages. Our low prices for such high quality can't be beat so get started today!

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(Sold for the TANO Dragon only by TANO Microcomputer Products, Corp. and its distributors)

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State of the Art, Quality, Integrity, Compatibility and Affordability. Five things good software must possess. Five things that epitomize the **VIP Library™**. Each program is the diamond of its class, true excellence. These programs are first in features, first in power, first in memory, and all are affordably priced. And for your convenience all disk programs can be backed up.

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All **Library** programs are written in machine code specifically for the Color Computer, to work without the interference of a separate operating system such as FLEX. From this comes speed and more workspace for you. Unlike other programs for the Color Computer which are said to be 64K compatible, **VIP Library™** programs are not limited to between 24 and 30K of workspace in 64K. **Library** programs have Memory Sense with BANK SWITCHING to fully use all 64K, thus giving up to 51K with a disk version and up to 53K with a tape version.

Easy To Use

Each **Library** program was carefully designed to be extremely easy to use. Built-in on-screen help tables are at your fingertips, as are menus of all kinds. Every effort is made to use logical, intuitive and easy-to-remember commands. The manuals have been thoughtfully prepared to cover every aspect of the program, and they have complete tutorials to get you going right away. We set the standard!

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> *". . . PICTURE getting your instantaneous investment report over the phone, using it in your spreadsheet calculation, generating a report, and writing a memo including that report and data from your database with your word processor, and all this with VIP Library™ programs . . ."*

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All **Library** programs are compatible. Transfer and use of files between programs is easy and carefree. What's better, when you have learned one program the others will come easy. And every program is the best of its kind available.

The Library Programs

For your writing needs is the **VIP Writer™**, and its spelling checker, the **VIP Speller™**. For financial planning and mathematical calculations you can use the **VIP Calc™**. To manage your information and send multiple mailings there is the **VIP Database™**. For sending all these files to and from home or the office and for talking to your friends you can have the **VIP Terminal™**. Finally, to fix disks to keep all your **Library** files in good repair we offer the **VIP Disk-ZAP™**.

Mini Disk Operating System

The Disk versions each have a Mini Disk Operating System which will masterfully handle from 1 to 4 drives. It offers smooth operation for such features as the ability to read a directory, display free space on the disk, kill files, save and automatically verify files, and load, rename and append files. **Library** programs simply do not have the limitations of BASIC.

Professionalism

The **Library** comes handsomely bound in gold-embossed, padded leatherette binders to grace your work area with the professionalism it deserves. Welcome the **VIP Library™** into your home and office.

A description of each of the **Library** programs, with the special sale price, is contained in the following pages. Please indulge!

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VIP Writer™

(Formerly Super "Color" Writer II)

By Tim Nelson

RATED TOPS IN RAINBOW, HOT COCO, COLOR COMPUTER MAGAZINE & COLOR COMPUTER WEEKLY

The Official Dragon Microcomputer Word Processor†

The most powerful and easy-to-use word processor is available in the showpiece and workhorse of the **Library: The VIP Writer™**. Because of its undisputed superiority over all Color Computer word processors, it was selected by Dragon Data Ltd. of England and TANO in the U.S., to be the Official Word Processor for their line of Dragon microcomputers.

The result of two years of research, the **VIP Writer™** offers every feature you could desire from a word processor. It is the most powerful, fastest, most dependable and most versatile. With the hi-res display, workspace and compatibility features built into the **Library** the **Writer** is also the most usable.

"*. . . Nearly every feature and option possible to implement on the Color Computer. The design of the program is excellent; the programming is flawless . . . Features for the professional, yet it is easy enough for newcomers to master . . . Certainly one of the best word processors available for any computer . . .*" October 1983 "Rainbow"

"*Word processing with VIP Writer is like driving a high-performance vehicle . . . This Ferarri of a package has more features than Telewriter, Easywriter (for the IBM PC), or Applewriter.*" October 1983 "Hot CoCo"

The **Writer** will work with you and your printer to do things you always wanted to do. Every feature of your printer can be put to use, every character set, every graphics capability at any baud rate, EVEN PROPORTIONAL SPACING. All this with simplicity and elegance. You can even automatically print multiple copies.

Although all versions feature tape save and load, the disk version provides the Mini Disk Operating System common to the whole **Library**, plus disk file linking for continous printing.

Professional features of particular note:

- Memory-Sense with **BANK SWITCHING** to fully utilize 64K, giving not just 24 or 30K, but up to 61K of workspace with the rompak version and 50K with the disk version.
- TRUE FORMAT WINDOW allowing you to preview the printed page ON THE SCREEN BEFORE PRINTING, showing centered lines, headers, FOOTNOTES, page breaks, page numbers, & margins in line lengths of up to 240 characters. It makes HYPHENATION a snap.
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- FREEDOM to imbed any number of PRINTER CONTROL CODES anywhere, **EVEN WITHIN JUSTIFIED TEXT**.
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- Automatic justification, automatic pagination, automatic centering, automatic flush right, underlining, superscripts, subscripts, pause print, single-sheet pause, and print comments.
- Type-ahead, typamatic key repeat and key beep for the pros, ERROR DETECTION and UNDO MISTAKE features, 3 PROGRAMMABLE functions, auto column creation, and an instant on-screen HELP TABLE.

32K (Comes with tape & disk) $59.95

†Sold as the Dragon Writer™ ONLY by Dragon Data Ltd. and its distributors.

NEW

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WITH A 60,000 WORD INDEXED DICTIONARY!

By Bill Argyros

Gone are the eyestrain, boredom and fatigue from endless proofreading. **VIP Speller™** is the fastest and most user-friendly speller for your CoCo. It can be used to correct any ASCII file — including **VIP Library™** files and files from **Scripsit™** and **Telewriter™**. It automatically checks files for words to be corrected, marked for special attention or even added to the dictionary. You can even view the word in context, with upper and lowercase. **VIP Speller™** comes with a specially edited 60,000 word dictionary which, unlike other spellers for the CoCo, is indexed for the greatest speed. The shorter your file, the quicker the checking time. And words can be added to or deleted from the dictionary or you can create one of your own. **VIP Speller™** also comes with the **Library's** mini disk operating system for easy disk manipulation.

32K DISK ONLY $39.95

Lowercase displays not available with this program.

VIP™ Library

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(Formerly Super "Color" Calc)

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By Kevin Herrboldt

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VIP Calc™ is truly the finest and easily the most powerful electronic worksheet and financial modeling program available for the Color Computer. Now every Color Computer owner has access to a calculating and planning tool better than VisiCalc™, containing all its features and commands and then some, WITH USABLE DISPLAYS. Use Visicalc templates with **VIP Calc™!**

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Both versions feature Tape save and load, but the disk version also has the Mini Disk Operating System of the entire **Library**.

32K (Comes with tape & disk) $59.95

32K does have hi-res displays, sort or edit.

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VIP Terminal™

(Formerly Super "Color" Terminal)

RATED BEST IN JANUARY 1984 "RAINBOW"

By Dan Nelson

From your home or office you can join the communication revolution. The **VIP Terminal™** opens the world to you. You can monitor your investments with the Dow Jones Information Service, or broaden your horizons with The Source or Compuserve, bulletin boards, other computers, even the mainframe at work.

For your important communication needs you've got to go beyond software that only lets you chat. You need a smart termnal so that you can send and receive programs, messages, even other **VIP Library™** files. **VIP Terminal™** has "more features than communications software for CP/M, IBM and CP/M 86 computers." Herb Friedman, Radio Electronics, February 1984.

FEATURES: Choice of 8 hi-res lowercase diplays * Memory-Sense with BANK SWITCHING for full use of workspace * Selectively print data at baud rates from 110 to 9600 * Full 128 character ASCII keyboard * Automatic graphic mode * Word mode (word wrap) for unbroken words * Send and receive **Library** files, Machine Language & BASIC programs * Set communications baud rate from 110 to 9600, Duplex: Half/Full/Echo, Word length: 7 or 8, Parity: Odd/Even or None, Stop Bits: 1-9 * Local linefeeds to screen * Save and load ASCII files, Machine Code & BASIC programs * Lowercase masking * 10 Keystroke Multiplier (MACRO) buffers to perform repetitive pre-entry log-on tasks and send short messages * Programmable prompt or delay for send next line * Selectable character trapping * Send up to ten short messages (KSMs), each up to 255 characters long, automatically, to save money when calling long distance.

All versions allow tape load and save of files and KSMs, but the disk version also has the Mini Disk Operating System common to the **Library**.

32K (Comes with tape & disk) $49.95

(Tape comes in 16K but without hi-res displays)

Softlaw

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TRS-80 is a trademark of Tandy Corp. VisiCalc is a trademark of VisiCorp.

AUTHOR'S SUBMISSIONS ARE ENCOURAGED.

VIP Database™

(Formerly Super "Color" Database)

INCLUDES MAIL MERGE CAPABILITIES TOO!

By Tim Nelson

This high speed MACHINE LANGUAGE program fills all your information management needs, be they for your business or home. And it does so better than any other database program for the Color Computer, featuring machine code, lowercase screens and mailmerge capabilities. Inventory, accounts, mailing lists, family histories, you name it, the **VIP Database™** will keep track of all your data, and it will merge **VIP Writer™** files.

The **VIP Database™** features the **Library** Memory Sense with BANK SWITCHING and selectable lowercase displays for maximum utility. It will handle as many records as fit on your disk or disks. It is structured in a simple and easy to understand menu system with full prompting for easy operation. Your data is stored in records of your own design. All files are fully indexed for speed and efficiency. Full sort of records is provided for easy listing of names, figures, addresses, etc., in ascending or descending alphabetic or numeric order. Records can be searched for specific entries, using multiple search criteria. With database form merge you may also combine files, sort and print mailing lists, print "boiler plate" documents, address envelopes - the list is endless. The math package even performs arithmetic operations and updates other fields. Create files compatible with the **VIP Writer™** and **VIP Terminal™**. Unlimited print format and report generation with the ability to imbed control codes for use with all printers.

As with all other **Library** programs, the **Database** features the powerful Mini Disk Operating System.

32K DISK $59.95

64K Required for math package & mail merge

VIP Disk-ZAP™

(Formerly Super "Color" Disk-ZAP)

RAVED ABOUT IN THE APRIL 1983 "RAINBOW!"

By Tim Nelson

Your database file disk, form letter disk, or BASIC program disk goes bad. An I/O error stops loading, or even backing up of the disk. Weeks, even months of work sit on the disk, irretrievable. Now catastrophic disk errors are repairable, quickly and with confidence, using the **VIP Disk-ZAP™**. It is the ultimate repair utility for simple and quick repair of all disk errors. Designed with the non-programmer in mind, the **VIP Disk-ZAP™** will let you retrieve all types of bashed files, BASIC and Machine Code programs.

This high-speed machine code disk utility has a special dual cursor screen display to look at the data on your disk. You are able to: Verify or modify disk sectors at will * Type right onto the disk to change unwanted program names or prompts * Send sector contents to the printer * Search the entire disk for any grouping of characters * Copy sectors * Backup tracks or entire disks * Repair directory tracks and smashed disks * Full prompting to help you every step of the way * 50-plus page Operators Manual which teaches disk structure and repair.

16K DISK $39.95

Lowercase displays not available with this program.

VISA

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P.O. Box 11932, Edmonton, Alberta T5J 3L1 (403) 421-8003

MAIL ORDERS: $3.00 U.S. Shipping ($5.00 CANADA; $10.00 OVERSEAS). Personal checks allow 3 weeks.

All Disk Programs are also available on 3" Diskettes for the Amdek Color AMDISK-III Micro-Floppy Disk System for an additional $3.00 each.

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```
510 N$(4)="BENU4E3L4BG4BL2"
520 N$(5)="BER4U2L3HER3BG5BL5"
530 N$(6)="BU2FR2EU2NHGL2HER2BG5
BL4"
540 N$(7)="BUNR4UE3BG5BL4"
550 N$(8)="BER2EHEHL2GFNR2GFBGBL
6"
560 N$(9)="BER2EHL2GNFU2ER2FBG4B
L6"
570 GOTO 70
580 REM"***  A BRIEF EXPLANATION
 OF HOW TO COMPUTE THE AREA AND
PERIMETER"
590 CLS8:PRINT@6,"SQUARES & RECT
ANGLES";
600 PRINT@96,"YOU FIND THE PERIM
ETER BY ADDINGUP THE TOTAL OF TH
E 4 SIDES.      ";
610 PRINT@256,"YOU FIND THE AREA
 BY MULTIPLYINGTHE BASE BY THE H
EIGHT.          ";
620 PRINT@486,"press enter to be
gin";
630 EN$=INKEY$:IF EN$=""THEN 630
640 PCLS:SCREEN1,1:PMODE3,1
650 A=50:B=150+RND(90)
660 C=10:D=60+RND(60)
670 REM"*** DRAW THE FIGURE"
680 LINE(A,C)-(B,D),PSET,BF
690 REM"***COMPUTE AND DRAW THE
```

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```
HEIGHT AND BASE"
700 HT$=STR$((D-C)/2)
710 HU$=RIGHT$(HT$,1)
720 PO=ASC(HU$)
730 PO=PO-48
740 HV$=MID$(HT$,2,1)
750 PT=ASC(HV$)
760 PT=PT-48
770 RT$=STR$((B-A)/2)
780 RU$=RIGHT$(RT$,1)
790 RO=ASC(RU$)
800 RO=RO-48
810 RV$=MID$(RT$,2,1)
820 RT=ASC(RV$)
830 RT=RT-48
840 DRAW"A2C2S8BM20,50"+N$(PO)+S
P$+N$(PT)
850 DRAW"BM120,120"+N$(RO)+SP$+N
$(RT)
860 COLOR3:LINE(0,140)-(255,140)
,PSET
870 REM" 'SD' AND 'PO' ARE THE C
ORRECT NUMERICAL VALUES FOR THE
HEIGHT AND BASE"
880 SD=(10*PT)+PO:SE=(10*RT)+RO
890 J=0:DRAW"A0S4C3BM1,160"+T$+H
$+E$+SP$:DRAW+P$+E$+R$+I$+M$+E$+
T$+E$+R$:DRAW+SP$+I$+S$
900 COLOR 2:LINE(200,165)-(240,1
65),PSET
910 DRAW"A2S8C4BM210,150"
920 REM"*** ACCECPT AND DRAW UP
TO FIVE NUMERALS FOR THE ANSWER
TO THE PERIMETER QUESTION"
930 FOR J=1 TO 4
940 NN$(J)=INKEY$:FORT=1TO50:NEX
TT
950 IF NN$(J)="" THEN 940
960 IF NN$(J)=CHR$(13) THEN 1000
970 NK=VAL(NN$(J))
980 DRAW+N$(NK)
990 NEXT J
1000 NN$(5)=NN$(1)+NN$(2)+NN$(3)
+NN$(4)
1010 DF=VAL(NN$(5))
1020 REM" ****  CHECK TO SEE IF
THE STUDENT'S ANSWER 'DF' EQUALS
 THE SUM OF THE SIDES 'SD+SE+SD+
SE'
1030 IF DF=SD+SE+SD+SE  THEN 117
0
1040 REM"*** IF INCORRECT, THEN
DRAW THE CORRECT ANSWER"
1050 DRAW"A0S4C3BM1,175"+S$+O$+R
$+R$+Y$+SP$
1060 DRAW+"BU10":DRAW"BM80,165"
1070 SD$=STR$(SD+SE+SD+SE)
1080 FOR KL=1TO LEN(SD$)
1090 OO=ASC(MID$(SD$,KL,1))
1100 OO=OO-48:IF OO<0 THEN OO=0
```

```
1110 DRAW"S8A2C2"+N$(OO)
1120 NEXT KL : KL=0
1130 IF LEFT$(SD$,1)=" " THEN DR
AW "C1BM80,165"+N$(0) : REM" ***
ERASE A POSSIBLE LEADING ZERO"
1140 DRAW"A0S4C3BM140,175"+I$+S$
+SP$+C$+O$+R$+R$+E$+C$+T$
1150 GOTO 1180
1160 REM"*** CORRECT MESSAGE"
1170 DRAW"A0S4C2BM80,175"+C$+O$+
R$+R$+E$+C$+T$
1180 EN$=INKEY$:FORT=1TO10:NEXTT
1190 REM"*** ERASE MESSAGES"
1200 IF EN$="" THEN 1180
1210 PAINT(1,160),3,3
1220 PAINT(1,190),1,1
1230 COLOR3:LINE(0,140)-(255,140
),PSET
1240 REM"*** REPEAT THE SAME PRO
CEDURES FOR THE AREA QUESTION"
1250 J=0:DRAW"A0S4C3BM1,160"+T$+
H$+E$+SP$+A$+R$+E$+A$:DRAW+SP$+I
$+S$
1260 COLOR2:LINE(200,165)-(240,1
65),PSET
1270 DRAW"A2S8C4BM210,150"
1280 COLOR3
1290 FOR J= 1 TO 4
1300 NN$(J)=INKEY$:FORT=1TO50:NE
XTT
1310 IF NN$(J)=""THEN 1300
1320 IF NN$(J)=CHR$(13) THEN 135
0
1330 NK=VAL(NN$(J))
1340 DRAW+N$(NK):NEXT J
1350 NN$(6)=NN$(1)+NN$(2)+NN$(3)
+NN$(4)
1360 DF=VAL(NN$(6))
1370 IF DF=SD*SE THEN 1490
1380 DRAW"A0S4C3BM1,175"+S$+O$+R
$+R$+Y$+SP$
1390 DRAW+"BU10":DRAW"BM80,165"
1400 SD$=STR$(SD*SE)
1410 FOR KL=1 TO LEN(SD$)
1420 OO=ASC(MID$(SD$,KL,1))
1430 OO=OO-48:IF OO<0THEN OO=0
1440 DRAW"S8A2C2"+N$(OO)
1450 NEXT KL:KL=0
1460 IF LEFT$(SD$,1)=" " THEN DR
AW"C1BM80,165"+N$(0)
1470 DRAW"A0S4C3BM140,175"+I$+S$
+SP$+C$+O$+R$+R$+E$+C$+T$
1480 GOTO 1500
1490 DRAW"A0S4C2BM80,175"+C$+O$+
R$+R$+E$+C$+T$
1500 EN$=INKEY$:FORT=1TO50:NEXTT
1510 IF EN$=""THEN 1500
1520 GOTO 640
```

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Reserved Words

AND	ARRAY	BEGIN	CASE	CONST	DIV
DO	DOWNTO	ELSE	END	EXTERN	FOR
FORWARD	FUNCTION	IF	MOD	NOT	OF
OR	OTHERWISE	PROCEDURE	PROGRAM	READ	REPEAT
THEN	TO	TYPE	UNTIL	VAR	WHILE
WRITE	WRITELN	NEW	MARK		

Supervisor Commands

Load	Save	Edit	Compile	Go	Gp
Move	Quit				

Disk PASCAL includes these added features:

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- The entire PASCAL system is contained in two files, leaving plenty of disk space for the program development.
- An editor is required to create the Pascal source files (ASCII files). Computerware's Color Editor is available with the Pascal package at a discount.

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PROCEDURE PSET(X,Y,COLOR) — Turns on the pixel at (X,Y,) to specified color.

PROCEDURE PCLS(COLOR) — Clear the graphics screen to COLOR.

FUNCTION PPOINT(X,Y) -- Returns the color code of the specified pixel.

FUNCTION JOYSTICK(NUMBER) — Returns the value of any of the joysticks or the buttons.

PROCEDURE SOUND(TONE,DURATION) — Plays a note on the TV speaker of the specified TONE for the specified duration.

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Functions Supported:

ABS	INKEY$	JOYSTK	PEEK	PEEK#
PPOINT	RND	SGN	SQR	TIMER
+	-	*	/	=
<	>	AND	OR	NOT

Instructions Supported:

CIRCLE	CLS	COLOR	DATA	
DIM	END	EXEC	FOR-STEP-NEXT	
GET	GOSUB	GOTO	IF-THEN-ELSE	
LET	LINE	MOTOR (ON/OFF)	ON n GOTO or GOSUB	
PAINT	PCLS	PCOPY	PMODE	
POKE	POKE#	PRESET	PRINT	
PSET	PUT	READ	REM	
RESTORE	RETURN	SCREEN	SOUND	UFR

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The Screen Quizzes

By Fred B. Scerbo

Editor's Note: This month marks the second installment of a new regular feature by **Rainbow** *contributing editor and programmer, Fred B. Scerbo, titled "the Rainbow Wishing Well." In this column, Fred will introduce specialized programs for the CoCo which he has developed for his friends who have had specific problems or tasks that they would like their CoCo to do for them. If any of you have suggestions for tasks you would like your CoCo to perform, especially if they are educational in nature, you may forward them to Fred, c/o* **the Rainbow**. *We are not promising that any such "wish" will be granted, but if a task looks especially interesting or challenging to Fred, he may list a program in these columns to accomplish your task. Please remember that any programs resulting from these suggestions become the property of the author. Here is the second such program that resulted from someone's "wish."*

During the last three years, my Color Computers have played a major role in my classroom preparations. The students I teach at the high school level are often special needs students who need supportive help in one or more of their regular education subjects. In these cases, students will bring assignments from their regular classes such as history or science, and I will help them review notes and readings in preparation for tests. When I first started using my CoCo for these classes, I found that I was spending four or five hours writing "student specific" programs, which could only be used by one or two students for a few minutes each day. When that subject or chapter was completed, my finished program was of little value to me until the following year, and consequently, would be put on the shelf to collect dust.

At that point I decided to work on some type of review program which I could spend a "few minutes" updating, yet students could use for hours, rather than vice versa.

One such program actually did appear in the May 1982 issue of *the Rainbow*. The name of the program was *Testem* and it was written by Jorge Mir. On receiving my *Rainbow*, I quickly keyed in *Testem* and used it quite often with some of my students. *Testem* was quite an interesting program in that it allowed the user to pick two categories (i.e., term and definition, date and event, etc.) and enter into memory groups of information to be used for a quiz. The program would then create a multiple choice or fill-in quiz.

What was unique about *Testem* is that it would create multiple choice questions in which the "wrong choices" would actually be the correct choices to other terms or questions. Gone were the days when teachers would have to create multiple choice questions such as:

1) Columbus discovered the New World in:

a) 1942
b) 1492
c) 1493
d) 1934

Take my word for it. A teacher can quite often drive himself crazy thinking up "wrong choices." This idea from *Testem* was quite good!

However, there were a few features to *Testem* which I did not particularly need or wish to use.

First, while the program was designed to be user friendly, there were much too many questions to be answered before the students could get to the quiz. (i.e., "Would you like multiple choice or fill-in ?" "Do you want the TERM first ?" etc.) This menu could prove to be too confusing for my students who often had below grade level reading abilities. What was needed was a quiz that once organized, would quickly get down to business.

Secondly, *Testem* required the use of either disk or tape loaded files. I am one who absolutely avoids loading files at all costs. When dealing with an educational program, I have found the best formula to be "load it once and let it roll." Since tape loaded files are the easiest to mess up when reloading, the last thing an instructor needs is to have a student sitting in front of the machine waiting while the instructor fumbles around trying to get the information into the machine. If the same information were in *DATA* statements, it could

---

(Fred Scerbo is a special needs instructor for the North Adams Public Schools. He holds a master's in education and published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.)

be edited or added to without too much trouble. Thus, when the program is saved, everything that is needed for instruction is in the loaded program. A simple *RUN* statement and the student is off and running.

Thirdly, the manner in which the fill-in section was designed required that the person using the program type in the answer, letter for letter, correctly. Therefore, if the answer to a fill-in was George Washington and the student typed in G. Washington, the program would say the answer was incorrect. This would happen because the program would compare the two strings. Thus, what might be a logically correct answer would be marked wrong, only further confusing my students.

Since I have been putting on teacher training workshops in various New England school systems, I was also confronted with similar needs by the teachers I worked with. Their "wish" was to also have software tools which would allow them to spend just a little time updating programs which would relate to the material their students were working on. Too often these teachers would not fully utilize their computers because they did not have the finances to purchase specific educational software. What was needed was a way to efficiently and effectively make use of these microcomputers.

> *"This [program] becomes a powerful tool for study . . . You could use it to study vocabulary, a foreign language, history or any subject . . . The possibilities are unlimited . . . "*

Thus, my new task was to come up with a program(s) which would accomplish what *Testem* was capable of doing as well as the needs expressed by my colleagues. The two programs presented here were thus designed to meet these needs. Here are some additional things which I included in my quiz programs.

First, my program would include routines which would prevent the break-up of words in sentences. *Testem* had this feature as well, but since I would be translating this program for school systems unfortunate enough to have been saddled with Apples or Pets or, worse yet, Atari 800s, I needed to make my program statements include variables which would allow for varying screen widths. (The variable SW in both programs thus stands for one less than the maximum screen width.) I have made listings or translations for these programs, but the translations are not included in these listings.

Secondly, *Testem* only had four choices and kept repeating problems which had been missed. I did not want to repeat missed material, so that feature was not included. However, at the suggestion of fourth grade math instructor Jack Lamoureaux, a fellow CoCo user at East School in North Adams, I included a fifth choice, "not given." Jack's rationale was that since his students had to take the California Achievement Tests, a standardized multiple choice test which included a "not given" category, using my program would help them prepare for the concept of noticing that the correct answer was not always there. Therefore, both listings here include a "not given" which is actually the choice on some problems. (In either case, the screen would always display the actual answer after the student made his or her selection. What good was it to know the answer was "not given" without showing the correct answer?)

Thirdly, Jack is also one who is big on having some type of graphic reward presented if the student gets a perfect score. (This feature isn't so important at the high school level, but for fourth grade it is okay.) Therefore, the first listing includes a REM statement as to where to include your graphic reward if desired. I will spend more time on that later.

Thus, the result of these wishes are the two program listings shown here. The first version requires at least 16K Extended BASIC since it uses graphics, while the second listing will work in Color BASIC and can even be keyed into the MC-10 (although the memory expansion is probably needed).

The advantage to the first listing is that it includes my high resolution graphic text characters that I developed for the IMB word processor, *Wordclone*. This basic screen text generator uses *PMODE 4* with the green screen and will allow up to 42 characters by 22 lines in true upper- and lowercase with descenders. Some educators had pointed out to me that rarely does an elementary teacher use all uppercase in any kind of writing for students, so why do it that way on the computer? I think you will find that the characters are very readable and fold out onto the screen in a smooth fashion. This expanded screen is extremely valuable when it is necessary to display more text on the screen than the CoCo normally allows. This is helpful when using long definitions, or paragraphs.

Even if you have Extended BASIC, you will probably want to key in the Color BASIC version because it has some advantages over the extended version. Say, for example, you are going to prepare terms and definitions for study. If we are using single word definitions and use the graphic version, then most of our text will be crammed into the upper left-hand corner of the screen. In a case such as this, our screen would have too much blank space which could prove to be distracting. Also, since the program does not have to translate our string data to graphic characters, the program executes more quickly.

Using The Programs

Key in both programs taking care to make no entry errors. (Thank heaven for *Rainbow On Tape*!) If you make an error in the *DATA* statements, such as leaving out a comma, you will get an ?OD Error. Since all of the information for our test is placed in *DATA* statements at the end of the listing, we have to take great care in the *DATA* statements in the beginning of the Hi-Res version (Listing 1) since this information stores our character set. Also, be sure to press [SHIFT] 0 to get into upper- and lowercase when typing in the *DATA* statements which are in lowercase letters. You will get reversed lowercase when typing it in, but get real lowercase when the program is *RUN*.

In the Hi-Res version, each string which is to be displayed is called as W$ and is analyzed character by character using the MID$ function. When the ASC value of each character is determined, the corresponding graphic string is displayed using the *DRAW* statement. This routine is found in line 95. The variable Y stands for our screen height is and usually increased by values of 8. If we generate too much text, the screen will not scroll. The data found in listing one will create a fill-in quiz on commands of the Color Computer. I

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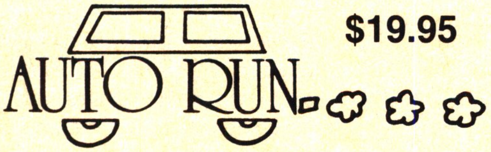

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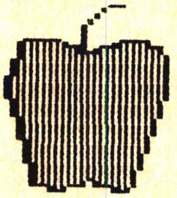

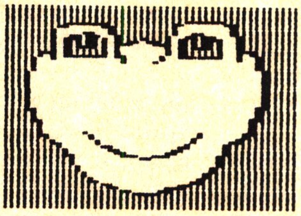

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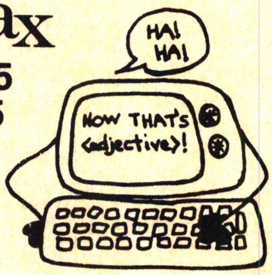
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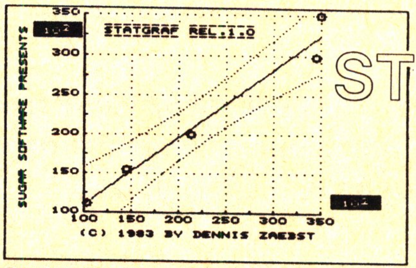

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have designed each statement so it is not so long as to fill the entire screen. Look at the data starting in line 1000. You will notice that each data line includes a first statement followed by a comma and the corresponding answer. (i.e., fill-in sentence, correct word.) This is the manner in which all of our data is structured.

Check the data in the second listing as well. You will notice that the data here is arranged in the same way, only in this case, the first statement is a question, rather than a fill-in sentence. Thus, either program can be used with two pieces of information which you wish to match such as a term and definition, a fill-in sentence and a term, or even a synonym and antonym.

Once you have each program saved to tape or disk, *RUN* them. You will notice that a name for the quiz appears on the screen. Look at line 5000 in both programs and you will notice that each reads:

```
5000 DATA END,Quiz Title
```

When the data is read, the word end serves as our flag to stop reading data. The next string after end, which is read at the same time, becomes our quiz title and is displayed at the beginning of the program. There is also a routine included which will center it in our screen layout.

Both quizzes will ask you if you wish to reverse the data. Thus, if you had entered your information as term and definition, answering yes would change them to definition and term instead. You should try each quiz both ways to see how useful they can really be.

Also, each time you *RUN* the programs, the order of the questions will be different. (We also keep resetting the random number generator while the program asks you the first question.) In order for the program to work, however, there must be at least five sets of data to sort. The variable AO(n) stands for Answer Order and is re-sorted with each run.

". . . I hope [this article] will be of value to those of you who want to have your youngsters or students use the CoCo for some educational uses."

I have found that 20 sets of data are usually the most you would want in a program even though both programs can handle up to 50. We do not want our program to take a whole class period to run. Therefore, pressing the letter S at any time will stop the program and display the student score.

Once all the questions have been answered, the screen will display the number correct, number wrong, and student score, based on the number of problems tried. The screen will also print, "ANOTHER TRY (Y/N)?" Pressing N will end the program and clear the screen. Pressing Y will completely rerun the program and, thus, re-sort the data again. When the student takes the quiz again, it will have become a different quiz. This becomes a powerful tool for study. Just imagine. You could use it to study vocabulary, a foreign language, history, or any subject where you can identify two matching groups of information. The possibilities are unlimited and your CoCo becomes a completely flexible educational tool.

Making Changes

Let's say you have now saved other versions to tape or disk and you want to put your own information in one of the programs to study. Once loaded, your first step is to type:

```
DEL 1000 –
```

and press [ENTER]. This is the delete command and by typing 1000 followed by a dash, we are telling our CoCo to delete every line from 1000 on. This will remove all of my data and prepare the "shell" of the program for your information. (These instructions remain the same for either program.)

Let's say you wish to create a test on opposites. Type:

```
5000 DATA END,WORDS THAT
ARE OPPOSITES
```

Since we have put the end flag at line 5000, it will not interfere with any information which we type in starting with line 1000. The words following end will appear as our title when the program is run.

Now let's make up some data. Try these lines:

```
1000 DATA HOT,COLD
1010 DATA UP,DOWN
1020 DATA YES,NO
1030 DATA GIVE,TAKE
1040 DATA NIGHT,DAY
1050 DATA NEVER,ALWAYS
1060 DATA LOUD,QUIET
1070 DATA FAR,NEAR
1080 DATA LIGHT,DARK
1090 DATA WON,LOST
```

We have just entered 10 sets of matching pieces of information. Remember, we must have at least five sets to make the program work. Now *RUN* your program. If you have not added an extra comma someplace, then the program should work.

If it is necessary for you to use commas, then simply surround each piece of data with quotes and use the commas inside the quotes. For example:

```
1000 DATA "MOE, LARRY, AND
CURLY
.","THE THREE STOOGES"
```

Now when this data is read, the commas inside the quotes will not confuse the program, since we normally use the comma to separate pieces of data.

You could also make a fill-in the sentence quiz in this fashion.

```
1000 DATA The first ...... on th
e moon was Neil Armstrong. , man
```

Use a strip of periods to form your blank in a sentence and then make your second piece of information after the comma the word that goes in the blank. Remember to make at least five sentences and to use quotes if you need to use commas in your sentences. Also remember to get into lowercase if you wish to use it in your *DATA* statements.

As you can see, the possibilities are unlimited. (If some of you think up some new uses for these shell programs, drop me a line and let me know.)

Graphic Reward

As I mentioned earlier, some of you may want to use a graphic reward if a perfect score is achieved. Here is a short example you can try which would have to appear directly after the REMark in line 850 and before the RETURN command.

```
860 PMODE3,1:PCLS1:SCREEN1,0
862 COLOR 2,4
864 CIRCLE(128,96),80,0,.9
866 PAINT(128,32),2,4
868 CIRCLE(128,92),55,0,.9,.05,.45
870 FOR L=0 TO 56 STEP 56
872 CIRCLE(100+L,80),10,0,1.4
874 PAINT(100+L,70),4,4
876 NEXT L
878 SOUND200,4
880 FOR L=1 TO 3000:NEXT L
```

These lines will create a large smile face. You may increase the value of the counting loop in line 880 if you wish to keep it on the screen longer. After the screen clears, your score will appear on the screen.

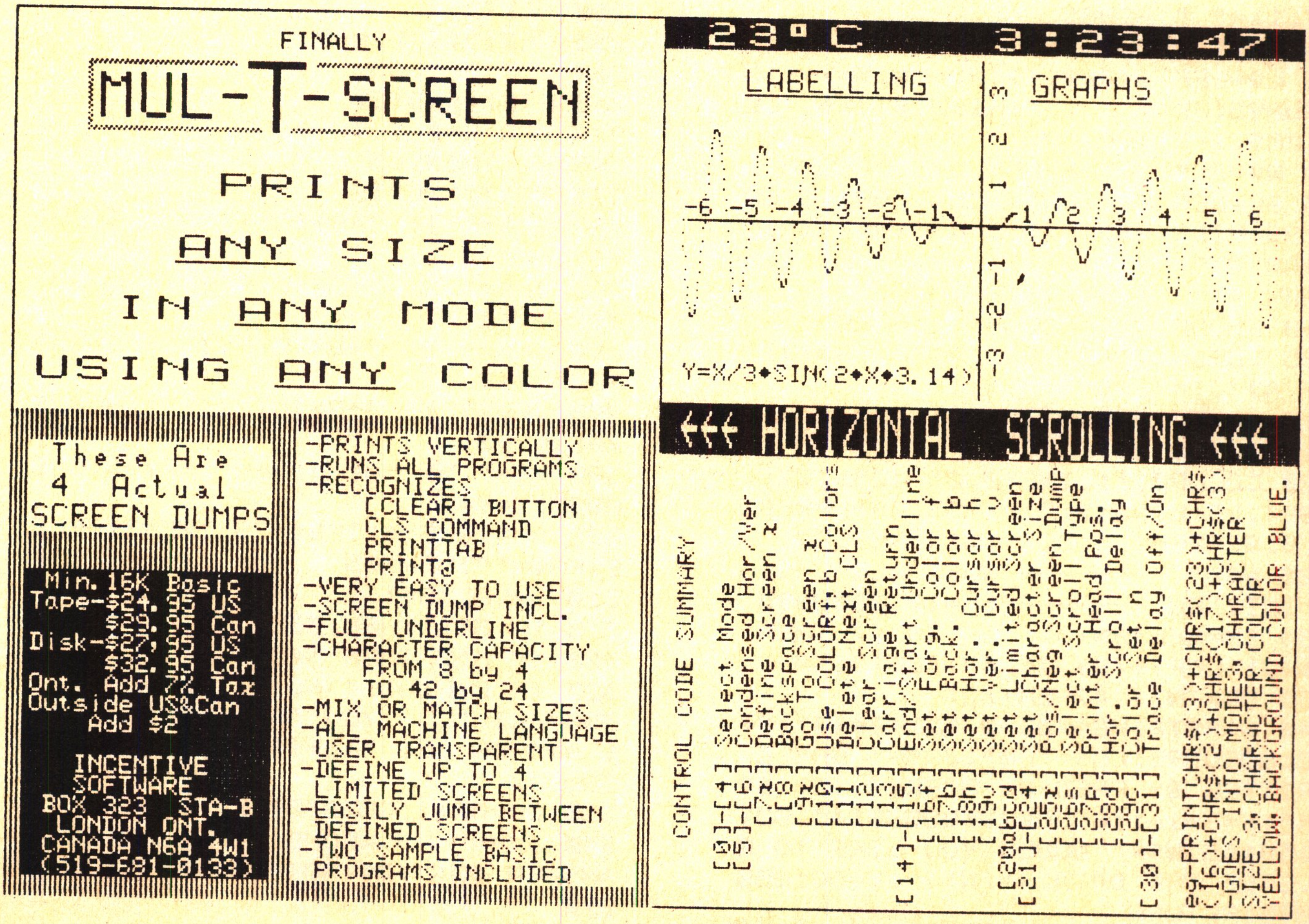
Even though this is just a simple graphic, I have prepared many more elaborate graphics (Remember *DRAW-EZ* a few months ago?) which I have included in some versions for Jack to use with his elementary students. We have different graphics for different seasons and holidays. Maybe those graphics will appear in a later issue.

I know this has turned into a rather lengthy article but I hope it will be of value to those of you who want to have your youngsters or students use the CoCo for some serious educational uses. Remember to forward some of your wishes to *the Rainbow* so I can see if we can come up with some solutions to your problems. Next month, I'll present another useful program which will utilize your CoCo in a way you may never have imagined.

60	42
115	185
220	190
315	50
800	189
1090	130
END	153

Listing 1:

```
10 '******************************
15 '*HI-RES SCREEN QUIZ PROGRAM*
20 '* BY FRED B.SCERBO (C)1984 *
25 '* ILLUSTRATED MEMORY BANKS *
30 '******************************
35 CLEAR2000:PCLS:DIMAA$(90),X(5
1),R(51),AO(50),A$(50),B$(50),NP
(50):CLS0:D=1:Y=8:M$=","
40 FORI=0TO250STEP6:K=K+1:X(K)=I
:NEXT:FORP=1TO90:READC$:AA$(P)=C
$:NEXT:GOTO100
45 DATA BR2UBU2U2,BU5NDBR3D,BRUN
LU3NLNURNUNRD3NLNRD,BRUNLREHL2UR
NUR2,BR3NUBL3UE3UBL3D,BRNHRU3FND
2HLNGHERFG,BU5BRRDG,BR2HU3E,BREU
3H,BU5BRFNLNGNENRNF,BU3BR2DNLNRD
,BRUNRDRDG,BRBU2R2,BRRUL,UE3U,BR
HNE3U3ERFD3GL,R2U5NLD5R
```



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TO 42 by 24
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-ALL MACHINE LANGUAGE
USER TRANSPARENT
-DEFINE UP TO 4
LIMITED SCREENS
-EASILY JUMP BETWEEN
DEFINED SCREENS
-TWO SAMPLE BASIC
PROGRAMS INCLUDED

```
50 DATA NR3UEREUHLG,BUFREUHNLEUL
3,BR3U5D3L3UE2R,BUFREUHL2U2R3,BU
FREUHLGU2ER,BU4UR3D2G3,BUFREUHLN
GHERFG,BRREU3HLGDFRE,BR2UBU2U,BR
2NEUBU2URDLBD3RDG,BR2H2UE2,BRBUN
R2BU2R2,BRE2UH2,BR2UBU2REHL2,,U2
NR3U2ERFD4
55 DATA U3NR2U2R2FGFDGL2,BUU3ERF
BD3GLH,U5RF2DG2L,NR3U3NR2U2R3,U3
NR2U2R3,BUU3ERBRBD3NLDGLH,U3NU2R
3NU2D3,BRU5,BUFEU4NRL2,U5D2RE2G2
F2D,NU5R3,U5FDRUED5,U5F3U3D5,U5R
3D5L3,U5R2FDGL2,BUU3ERFD3NHNFGLH
,U5R2FGL2F3,BUFREUHL2UERF
60 DATA BRU5LR3,NU5R3U5,BU5D3FDR
UEU3,NU5EU2RD2FU5,UE2H2BR3DGNLFD
2,BU5D2FRD2NLU2EU2,NR3UE3UL3,,,,
,,,U2R3U2NL2D4L3,NU5R3U4L3,NR2U4
R2,R3NU5U4L3D4,U4R3D2L3D2R3,BRU2
NLNR2U2ER,U4R3D4NL3D2L2,U4NUR2FD
3,BR2U3BU2RL2
65 DATA BR2U3BU2UBD4D2GL,NU5U3NR
2F3,RU5NLD5R2,U4FDRUED4,U4DERFD3
,U4R3D4L3,U4R3D4L3D2,U4R3D4NL3D2
,BRU4D2ER,R3U2L3U2R3,BRNR2U4NR2N
LU,NU4R3U4,BU4D2FDRUEU2,NU4EURDF
U4,UEHUBR3DGNLFD,BU4D3FR2NU4DGL,
NR3UE3L3
70 IF LEN(JK$)<=42THEN90
75 FOR T=42TO0STEP-1:IF MID$(JK$
,T,1)=" "THEN85
80 NEXT T:GOTO90
85 L$=LEFT$(JK$,T):W$=L$:Y=Y+8:G
OSUB95:JK$="     "+RIGHT$(JK$,(LE
N(JK$))-T):GOTO70
90 W$=JK$:Y=Y+8:GOSUB95:RETURN
95 SL=LEN(W$):DRAW CC$:FORI=1TOS
L:B$=MID$(W$,I,1):C=ASC(B$)-32::
DRAW"BM"+STR$(X(I))+","+STR$(Y):
DRAW AA$(C):NEXTI:RETURN
100 PMODE 4,1:COLOR0,1:PCLS
105 FORJ=1TO40:READ A$(J),B$(J):
IF A$(J)="END" THEN115
110 NEXTJ:GOSUB120:GOTO125
115 GOSUB120:GOTO125
120 COLOR0,1:LINE(0,0)-(256,22),
PSET,BF:LINE(2,2)-(253,20),PRESE
T,B:SCREEN1,0:CC$="C1":RETURN
125 W$="  ------- MULTIPLE CHOIC
E QUIZ ON -------":Y=10:GOSUB95
130 EM=LEN(B$(J)):IF EM>47 THEN
B$(J)=LEFT$(B$(J),47):GOTO130
135 DQ=INT((47-EM)/2)
140 W$=STRING$(DQ-2,32)+B$(J):Y=
18:GOSUB95:CC$="C0":JK$=" SHELL
WRITTEN BY FRED B. SCERBO (C) 19
84":Y=Y+16::GOSUB70:GOSUB145:GOT
0150145 W$=" WOULD YOU LIKE TO R
EVERSE THE DATA (Y/N)?":Y=50:GOS
UB95:RETURN
150 T$=INKEY$:UH=RND(-TIMER):IF
T$="N"THEN170ELSEIF T$="Y"THEN15
5ELSE150
155 CC$="C1":GOSUB145
160 FOR Q=1 TO J-1:TEM$=A$(Q):A$
(Q)=B$(Q):B$(Q)=TEM$:NEXT Q:CC$=
"C0"
165 GOTO 175
170 CC$="C1":GOSUB145:CC$="C0"
175 J=J-1
180 FORI=1 TO J
185 AO(I)=RND(J)
190 IF NP(AO(I))=1 THEN 185
195 NP(AO(I))=1
200 NEXTI
205 FOR Y=1TO1000:NEXTY
210 GOSUB355
215 COLOR0,1:LINE(4,4)-(252,18),
PSET,BF:CC$="C1"
220 W$="   WHICH NUMBER GOES WIT
H THE FOLLOWING?":Y=14:GOSUB95:C
C$="C0"
225 FOR P=1TOJ
230 JK$="     "+A$(AO(P)):Y=26:GO
SUB70:Y=Y+5
235 FOR Q=1TO4
240 C(Q)=RND(J):IF C(Q)=AO(P) TH
EN240
245 FOR K=Q-1 TO 0STEP-1:IF C(K)
=C(Q) THEN240
250 NEXTK
255 NEXTQ:C(5)=AO(P)
260 FOR E=1TO5
265 F(E)=RND(5)
270 FOR K=E-1 TO 0 STEP-1:IF F(K
)=F(E) THEN265
275 NEXTK:NEXTE
280 JK$=" 1) "+B$(C(F(1))):GOSUB
70:Y=Y+3
285 JK$=" 2) "+B$(C(F(2))):GOSUB
70:Y=Y+3
290 JK$=" 3) "+B$(C(F(3))):GOSUB
70:Y=Y+3
295 JK$=" 4) "+B$(C(F(4))):GOSUB
70:Y=Y+3
300 W$=" 5) not given":Y=Y+8:GOS
UB95:Y=Y+3
305 G$=INKEY$:IFG$="S"THEN370ELS
EIFG$=""THEN305
310 G=VAL(G$)
315 IF G<1 THEN 305
320 IF G>5 THEN 305
325 IF C(F(G))<>AO(P) THEN340
330 JK$="    YOU ARE CORRECT! TH
E ANSWER IS: "+B$(AO(P)):Y=Y+6:G
OSUB70
335 CR=CR+1:GOTO350
340 JK$="    WRONG! THE CORRECT
ANSWER IS:"+B$(AO(P)):Y=Y+6:GOSU
B70
```

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```
345 IR=IR+1
350 FOR Y=1TO1000:NEXTY:GOSUB355
:GOTO360
355 COLOR1,1:LINE(0,24)-(256,48)
,PRESET,BF:PMODE0,2:PCLS1:PMODE0
,3:PCLS1:PMODE0,4:PCLS1:PMODE4,1
:COLOR0,0:RETURN
360 NEXT P
365 IFCR=J THEN GOSUB 800
370 CLS:PRINT:PRINT
375 J=CR+IR:IF J=0 THEN J=1
380 PRINT"     NUMBER CORRECT = "
CR
385 PRINT
390 PRINT"     NUMBER WRONG    = "
IR
395 PRINT:PRINT"     STUDENT SCOR
E  = ";INT(CR*100/J);"%"
400 PRINT:PRINT"     ANOTHER TRY
(Y/N)";
405 W$=INKEY$:IFW$=""THEN405
410 IF W$="Y" THEN RUN
415 IF W$="N" THEN 425
420 GOTO405
425 CLS:END
800 REM STORE YOUR OWN GRAPHIC
REWARD HERE
980 RETURN
990 REM ENTER DATA AT LINE 1000
1000 DATA The term ....... means
 'RANDOM ACCESS MEMORY.',RAM
1010 DATA We cannot change the c
ontents of ....... although we c
an move it to RAM and examine it
 there.,ROM
1020 DATA The statement .......
would give us a random number no
 greater then ten.,RND(10)
1030 DATA BASIC is actually a ..
..... programming language.,high
 level
1040 DATA ASSEMBLY LANGUAGE is a
n example of .......... programm
ing.,low level
1050 DATA The 6809 is your COLOR
 COMPUTER'S .............,centra
l processing unit
1060 DATA The command ........ w
ill display the amount of free R
AM left.,PRINT MEM
1070 DATA If we wish to use more
 or fewer graphics pages then we
 must ....... additional pages.,
PCLEAR
1080 DATA The command ...... sta
rts a counting loop ended by the
 command 'NEXT'.,FOR
1090 DATA The command ...... end
s a counting loop started by the
 command 'FOR'.,NEXT
1100 DATA Any information found
in quotes is called a ....... an
d is designated as a variable wi
th a dollar sign.,STRING
1110 DATA A ......... is called
by the command 'GOSUB'.,subrotin
e
1120 DATA The command .........
ends a subroutine.,RETURN
1130 DATA The command ...... wil
l generate a random number no gr
eater than 100.,RND(100)
1140 DATA The command ...... wil
l display the program we have wr
itten on the screen.,LIST
1150 DATA An ......... statement
 compares two or more pieces of
information.,IF...THEN
1160 DATA The command ...... mak
es the program leave sequence an
d branch to another line.,GOTO
1170 DATA An ....... is a storag
e area reserved for either strin
g or numeric information.,ARRAY
1180 DATA ........ scans the key
board for a key being pushed.,IN
KEY$
1190 DATA To reserve additional
string space in memory you must
use the command ....... followed
 by a digit.,CLEAR
5000 DATA END,SAMPLE TEST USING
FILL-IN SENTENCES
```

210	51
440	169
720	223
END	1

Listing 2:

```
10 '*****************************
20 '* TEXT SCREEN QUIZ PROGRAM *
30 '* BY FRED B.SCERBO (C)1984 *
40 '*  149 BARBOUR ST.N.ADAMS  *
50 '* ILLUSTRATED MEMORY BANKS *
60 '*****************************
70 CLEAR3000
80 SW=31
90 CLS0
100 DIMAO(50),A$(50),B$(50),NP(5
0)
110 CLS0:GOTO180
120 IF LEN(JK$)<=SW THEN160
130 FOR T=SW TO 0STEP-1:IF MID$(
JK$,T,1)=" "THEN150
140 NEXT T:GOTO160
150 L$=LEFT$(JK$,T):W$=L$:GOSUB1
70:JK$="    "+RIGHT$(JK$,(LEN(JK$
```

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```
))-T):GOTO120
160 W$=JK$:PRINTW$:RETURN
170 PRINTW$:RETURN
180 FORJ=1TO50:READ A$(J),B$(J):
IF A$(J)="END" THEN200
190 NEXTJ:GOTO210
200 FORI=32TO95:PRINT@I,CHR$(175
);:NEXT
210 PRINT:PRINT"   MULTIPLE CHOI
CE QUIZ ON:"
220 EM=LEN(B$(J)):IF EM>30 THEN
B$(J)=LEFT$(B$(J),30)
230 DQ=INT((30-EM)/2)
240 PRINTTAB(DQ);B$(J)
250 PRINTTAB(14)"BY":PRINTTAB(8)
"FRED B. SCERBO":PRINTTAB(6)"COP
YRIGHT (C) 1983"
260 PRINT:PRINT"WANT TO REVERSE
THE DATA (Y/N) ?"
270 FORI=384TO447:PRINT@I,CHR$(1
75);:NEXTI
280 T$=INKEY$:UH=RND(6666):IF T$
="N"THEN 320
290 IF T$="Y" THEN310
300 GOTO280
310 CLS0:FOR Q=1 TO J-1:TEM$=A$(
Q):A$(Q)=B$(Q):B$(Q)=TEM$:NEXT Q
320 CLS0:J=J-1
330 FORI=1 TO J
340 AO(I)=RND(J)
350 IF NP(AO(I))=1 THEN 340
360 NP(AO(I))=1:NEXTI
370 FOR Y=1TO1000:NEXTY
380 FOR P=1TOJ
390 CLS
400 PRINT:JK$="    "+A$(AO(P)):GO
SUB120
410 FOR Q=1TO4
420 C(Q)=RND(J):IF C(Q)=AO(P) TH
EN420
430 FOR K=Q-1 TO 0STEP-1:IF C(K)
=C(Q) THEN420
440 NEXTK
450 NEXTQ:C(5)=AO(P)
460 FOR E=1TO5
470 F(E)=RND(5)
480 FOR K=E-1 TO 0 STEP-1:IF F(K
)=F(E) THEN470
490 NEXTK:NEXTE
500 PRINT
510 JK$=" 1-"+B$(C(F(1))):GOSUB1
20
520 JK$=" 2-"+B$(C(F(2))):GOSUB1
20
530 JK$=" 3-"+B$(C(F(3))):GOSUB1
20
540 JK$=" 4-"+B$(C(F(4))):GOSUB1
20
550 W$=" 5-NOT GIVEN":GOSUB170
560 G$=INKEY$:IFG$="S"THEN680
570 IF G$=""THEN560
580 G=VAL(G$)
590 IF G<1 THEN 560
600 IF G>5 THEN 560
610 IF C(F(G))<>AO(P) THEN640
620 PRINT:JK$="   YOU ARE CORREC
T! THE ANSWER IS: "+B$(AO(P)):GO
SUB120
630 CR=CR+1:GOTO660
640 PRINT:JK$="   WRONG! THE COR
RECT ANSWER IS: "+B$(AO(P)):GOSU
B120
650 IR=IR+1
660 FOR Y=1TO2000:NEXTY
670 NEXT P
680 CLS:PRINT:PRINT
690 J=CR+IR:IF J=0 THEN J=1
700 PRINT"    NUMBER CORRECT = "
CR
710 PRINT
720 PRINT"    NUMBER WRONG   = "
IR
730 PRINT:PRINT"    STUDENT SCOR
E  = ";INT(CR*100/J);"%"
740 PRINT:PRINT"    ANOTHER TRY
(Y/N)";
750 W$=INKEY$:IFW$=""THEN750
760 IF W$="Y" THEN RUN
770 IF W$="N" THEN END
780 GOTO750
990 REM ENTER DATA AT LINE 1000
1000 DATA WHAT IS THE NAME OF TH
E LANGUAGE IN OUR COLOR COMPUTER
 ?,BASIC
1010 DATA WHICH COMMAND WILL CLE
AR THE SCREEN FOR US ?,CLS
1020 DATA WHICH COMMAND WILL PIC
K A RANDOM NUMBER FROM ONE TO TE
N ?,RND(10)
1030 DATA WHICH COMMAND WILL PIC
K A RANDOM NUMBER FROM ONE TO FI
FTY ?,RND(50)
1040 DATA WHICH COMMAND WILL PIC
K A RANDOM NUMBER FROM ONE TO ON
E HUNDRED ?,RND(100)
1050 DATA WHICH COMMAND WILL STA
RT A COUNTING LOOP ?,FOR
1060 DATA WHICH COMMAND WILL END
 A COUNTING LOOP ?,NEXT
1070 DATA WHICH COMMAND WILL SEN
D THE PROGRAM TO A SUBROUTINE ?,
GOSUB
1080 DATA WHICH COMMAND WILL SHO
W US THE PROGRAM WHICH WE HAVE T
YPED INTO OUR MEMORY ?,LIST
1090 DATA WHAT DO WE CALL A LETT
ER WHICH STANDS FOR A NUMBER OR
A STRING ?,VARIABLE
5000 DATA END,SAMPLE SCREEN QUIZ
```

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Gaining Sophistication With Printing Techniques

By Richard A. White
Rainbow Contributing Editor

As you advance to more complicated programs that are giving more data to the user and requesting more in return, you will feel a need to clean up the screen. Things like words cut in half at the right edge will hopefully already have been conquered. Now, let's say you are working on man's most prolific program, the one that balances the checkbook. It sure would be nice to start at the left margin with the check number, and then on the same line enter the date, and still on the same line enter the amount, etc. And while we are at it, if the amount entry is 21.35, let's reprint it right now as $ 21.35 so it lines up neatly with the entry for the check before that was reprinted as $ 1872.99. Consider these entries to be in a publisher's checkbook and not in the impoverished author's.

And while you are at it, how about getting a neatly formatted check listing off the printer for comparison with the bank statement that just came. Sound tough for a beginner? Well, it does take some learning, but what doesn't? Everything needed except *PRINT USING* is in Color BASIC. While *PRINT USING* is indeed nice to have, we can do quite a bit without it. You can also write subroutines in Color BASIC to do tasks that would be done with commands in Extended BASIC.

It took me some time and not a little sweat to learn how to format the screen. But when the printer came, I found that most of what I knew about printing to the screen worked on the printer with only modest differences. One does not *PRINT@ 416,* to a printer. Likewise, the printer line may range from 32 to 132 or more characters depending on your printer. But, these differences are not a problem once you are aware of them.

(Richard White has a long background with microcomputers and specializes in BASIC programming. With Don Dollberg, he is the author of the TIMS data base management program.)

Print position control lies at the heart of print formatting. *PRINT* causes the first character to be printed at the current print position. There is an analogous position on a line at the printer. When printing, you don't see the print position moving, but you can think of it as doing so. When printing is complete, where is the print position? If you do nothing to control it, it will go to the first character position on the next line on the screen. Most, not all, printers advance to the next line on the page.

"A semicolon, immediately following a string in a *PRINT* statement, will suppress the carriage return and hold the print position at the location . . . following the last . . . string . . ."

At the risk of breaking the flow, be aware that some printers need to be sent a line feed character *CHR$(10)* since they will not automatically line feed after a carriage return. Fortunately, these are a small minority. But, if some guy catches you in an alley and offers to sell you a QPGZY 6.5 character per second typesetter and billboard painter for $100, know that you have been warned. Know also that some printers, including some Radio Shack models, will do an automatic line feed if they do not get a carriage return within about one second after the last character is received. This is generally not a problem, but I would not call it a feature, either.

Color BASIC provides two cursor control characters, the semicolon ";" and the comma ",". A semicolon, immediately following a string in a *PRINT* statement, will suppress the carriage return and hold the print position at the location immediately following the last printed character of the string. What about numbers? A printed number is sent as a string of characters to either the screen or the printer. So, it makes no difference what is in your *PRINT* or *PRINT#-2,* statements, if the last character is a “;” the next print position will be immediately following the last character printed.

If you use a comma in place of the semicolon, the print position will be tabbed to the beginning of the next “print zone.” In the “Extended Color BASIC Manual,” a print zone is called a “comma field width.” The default value of a comma field width is 16 characters. You can change the printer comma field width by *POKEing* whatever width you wish into memory location 153, e.g., *POKE 153, 10.* My tests show that you cannot change the screen’s comma field width. There is a memory location that holds this value, but BASIC resets it to 16 each time a *PRINT* statement is encountered. This is not really a problem, but again, not a feature, either.

I use the comma when printing menus on the screen. Try the following code.

```
10 CLS :PRINT :PRINT :PRINT“  1 FIRST MENU
CHOICE”,“  2 SECOND MENU CHOICE”,,,“  3
THIRD MENU CHOICE”
```

Since each string ends past position 17 on the screen line, the comma causes a carriage return and starts the next string on a new line. The three commas after “ 2 SECOND MENU CHOICE” causes the print position to move to the next line, then to the 17th character position and then to the second line down. This is a neat way to double space text with minimum typing. If your text ends before position 17, you will need an extra comma.

Since you can *POKE* a different comma field width for the printer, you can set up tables of equal width columns fairly easily.

```
10 FOR X=1 TO 4 :PRINT#-2,“  ” :NEXT :POKE
153,10 : PRINT#-2,“ ”,“COLUMN 1”,“COLUMN
2”,“COLUMN 3”,“COLUMN 4”,“COLUMN 5”,“COL-
UMN 6”,“COLUMN 7”
15 PRINT#-2,STRING$ (80,“-”) :PRINT #-2,“  ”
20 FOR X=1 TO 20 :PRINT#-2, ST$(X),:FOR Y=1 TO
7:PRINT#-2,VL(X,Y), :NEXT:PRINT#-2,“   ”:NEXT
```

This code will print four blank lines, then 10 spaces (we set the comma field width at 10 with *POKE 153,10*), and then the headings column 1 through column 7 at 10-space increments. In line 15, we dress things up with a row of dashes and a blank line. Line 20 prints a 20-line by seven-column array of numbers with an identifier, ST$(X), for each row in column 1. We discussed arrays last month and showed one example of their power and ease of use. Here is another where they permit accomplishment of a good amount of work with minimum code.

Since we can get only two columns on the screen using the comma width field, we need a different tool to get more columns. *TAB()* to the rescue. *PRINT TAB(20)X* tells BASIC to print X starting at the 20th position on the line. *PRINT#-2, TAB(20)X* is the equivalent statement for the printer.

PRINT@ X, is only usable when printing to the screen. It is used to set the print location to any position on the screen directly. Even if your cursor is in line 16, you can print at the top left of the screen by using *PRINT@0, “XYZ”;* without otherwise changing what is on the screen. Screen positions are numbered sequentially starting at 0 and going to 511. The end of line one is 31, the start of line two is 32, etc. There are screen numbering diagrams in your manuals that are worth study. In fact, these are designed so you can copy them and use them as worksheets. It is good practice to use the semicolon with your *PRINT@ X,* statements so you always have full control of the screen position.

The *INPUT* and *LINEINPUT* statements are a pain since they always send a carriage return when you hit [ENTER] to complete the data entry. Say you wanted to enter data at a number of locations on the same line on a form that you had previously printed on the screen. Some data management programs allow the user to make up a form that displays on the screen with blank areas where data is to be entered. Say field three wants a two-character number to be entered at line positions 8 and 9 on line 5 while field four needs up to 10 characters entered starting at line position 21 on line 5. As soon as the number is entered using *INPUT,* the remainder of line five is wiped out, including the name for field four and the new print position ends up at the beginning of line six. *INKEY$* gives us a tool to do it right, but there will need to be more than just an *A$=INKEY$* statement to make it work. Let’s develop a general *INKEY$* subroutine that can be used in place of *INPUT* and *LINEINPUT* and which will provide some performance features those commands lack.

Let’s think about what those features might be. This is really writing a specification of what we want.

1) Have an option to limit the number of characters to be entered.

2) Print each character as it is typed.

3) Test for a carriage return to terminate data entry, but leave the print position where it is.

4) Automatically terminate data entry when the specified limit is reached.

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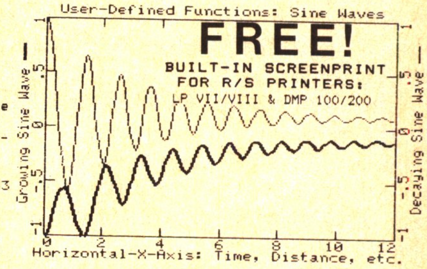

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5) Return a string. The string can be easily converted to a number if a number was to be entered. You can even build in a test to be sure that only numerals or a period are entered if a number is expected.

We will need some variables to carry information to and from the subroutine and for intermediate storage within the subroutine. Let's send the character count limit in LM. Within the subroutine, A$ will be an temporary storage variable and CT will be the character count variable. B$ will carry the resultant string back to the calling routine. Below is the subroutine.

```
10 B$=STRING$(LM,32) :CT=1
12 A$=INKEY$ :IF A$<>CHR$(13) THEN PRINT
A$; :MID$(B$,CT,1)=A$ :CT=CT+1 :IF CT<LM
THEN 12
14 RETURN
```

". . . Why not join those with Color BASIC in writing your own [routine]."

This subroutine is really a substitute for *LINEINPUT* with the additional features described above. It requires Extended BASIC (a revision for Color BASIC is shown below). On entry in line 10, B$ is defined as a string of spaces LM long. Be sure to give LM some value before calling the subroutine. The count variable is set to 1. A character is obtained in A$ and checked to be sure it is not a carriage return *(CHR$(13))*. If it is, the program goes to line 14 for the return. Otherwise, A$ is printed with the semicolon to hold the print position and put into B$ with the *MID$* command. This saves generation of string garbage and garbage collections delays. Finally, CT is incremented and tested. If CT=LM the program goes to 14, otherwise it goes to line 12 to get the next character. The routine will return B$ with some extra spaces whenever fewer than LM characters are entered before the carriage return. This can be corrected in the calling routine as follows: GOSUB10 :B$=LEFT$ (B$,CT).

For those with Color BASIC, the following subroutine works.

```
10 B$="" :CT=1
12 A$=INKEY$ :IF A$<>CHR$(13) THEN PRINT
A$; :B$=B$+A$ :CT=CT+1 :IF CT<LM THEN 12
14 RETURN
```

This avoids the use of *MID$* on the left, which is not in Color BASIC. It has the merit of sending back B$ whose length is exactly the number of characters entered so B$=LEFT$(B$,CT) is unneeded. Note that in both cases, the code is written to avoid using *ELSE* which slows execution.

You can *POKE* to the screen as well as *PRINT* to it. However, there a few tricks BASIC pulls of which you should be aware. Here is a short BASIC program that demonstrates these tricks. Enter and *RUN* it, then resume reading.

```
10 CLS :FORX=0TO255 :POKE1024+X,X :NEXT
20 FORX=0TO254 :PRINT@256+X,CHR$(X); :NEXT
30 GOTO30
```

The top half of your screen has been *POKEed* sequentially with values from 0 to 255 while these same values (except 255) were printed to the lower half of the screen. Most obviously, BASIC changes some values from the normal ASCII ones for characters when it loads the screen memory. The inverse video characters start at 1, 96 less than their ASCII values. Next the characters whose ASCII values are normally 32 to 63 are moved into the 97 to 127 area. Third, we have a whole new set of reverse characters including reverse video numbers that can be obtained by poking to the screen. In line 10 of the program above note that we start *POKEing* at the beginning of screen memory 1024. Add the screen location number that you would use with *PRINT@* to 1024 and you have the location to *POKE*. You can *PEEK* a location as well and now that you know how BASIC switches things around, you can make some sense out of what you *PEEK*.

Now for those waiting for instructions on how to format numbers neatly and aligned like we spoke of above. Bad news — that's your assignment. Those with Extended BASIC can use *PRINT USING*, of course, but why not join those with Color BASIC in writing your own? All you have to lose is some ignorance and maybe a little hair. I will be happy to publish any good routines sent me through *the Rainbow*.

Submitting Material To the Rainbow

Contributions to *the RAINBOW* are welcome from everyone. We like to run a variety of programs which will be useful/helpful/fun for other CoCo owners.

Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary, explaining how the program works. We're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a SASE to: Submissions Editor, *the RAINBOW*, P.O. Box 209, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

CRAPS... As It's Played At The Casino CoCo

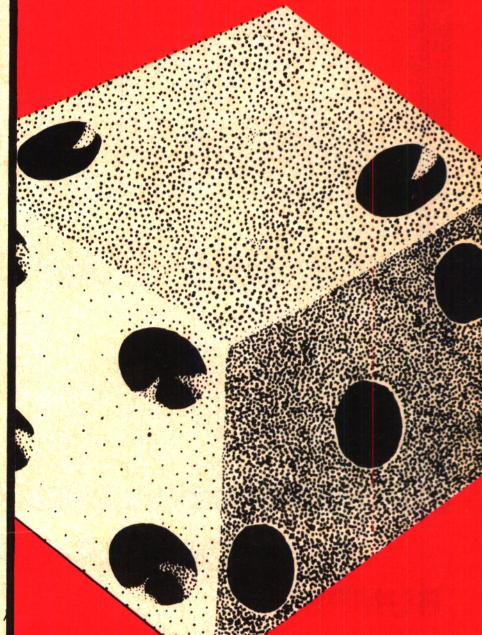
Program By Dan Drouillard

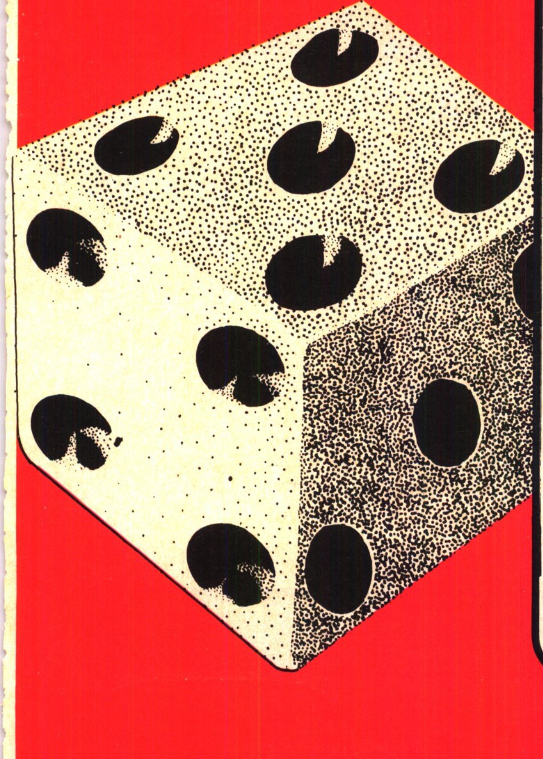
The croupier smiled his twenty-dollar smile. He rolled his head back just a bit to speak to the crowd beyond those close around him at the craps table, causing a brilliant reflection from the overhead lights to emanate from the faceted moon of a diamond embedded in a front tooth. His voice rolled across the layers of blue smoke, "*PCLEAR2* before *CLOADing*," he said.

Craps has always been a favorite among gamblers, and has been played by high rollers in private parlors for thousands of dollars, by grub-fisted hopefuls in dingy hallways for sometimes more, and by folks like you and me for usually much less. The common factor that ties us all together, it seems, is the thrill of laying it all on the line in the hope that the tumbling fates will perform their final transformation in our favor, thereby blessing us with a sudden increase in our material holdings. Also, adrenaline may be an addictive drug.

Now, a brief explanation of *Craps* rules as the game is played here at Casino CoCo. Following the croupier's advice to *PCLEAR2* and *CLOAD*, you next must type *RUN* and wait for the graphics to appear on screen. At this point, press the "P" key to begin play.

After entering your name and the names of one or two other players, the dice will be offered to the first person entered, who will have the

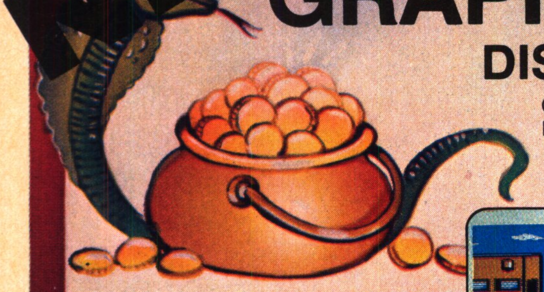


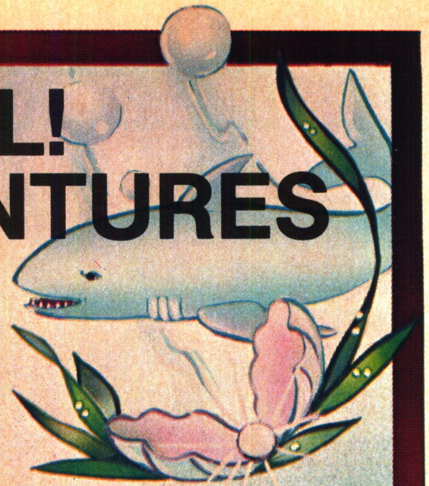


NEW! SENSATIONAL! GRAPHIC ADVENTURES

DISC NOT REQUIRED

Cassettes .... $24.95 ea.
Discs .... $27.95 ea.
32K Required



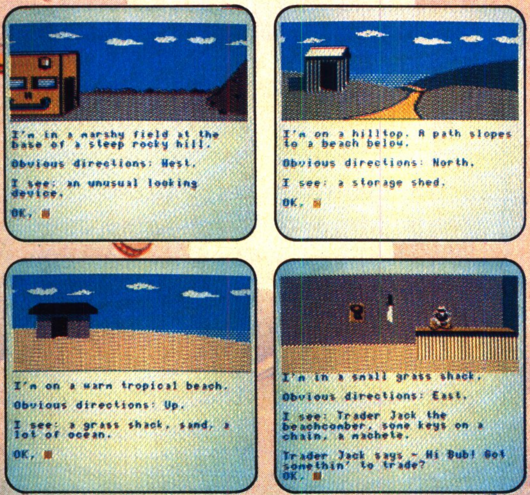


SHENANIGANS

From the heart of the city to lonely wilderness. An action filled journey to find the fabled pot of gold at the end of the rainbow. The first of our sensational new hi-res graphic adventures. You'll love it!

SEA QUEST

Get your shark repellant and scuba tanks ready to search for treasures under the sea. You'll run into a pirate, a mermaid and hungry sharks in this colorful and unique adventure. Outstanding!



```
I'm in a marshy field at the
base of a steep rocky hill.

Obvious directions: West.

I see: an unusual looking
device.

OK,
```

```
I'm on a hilltop. A path slopes
to a beach below.

Obvious directions: North.

I see: a storage shed.

OK,
```

```
I'm on a warm tropical beach.

Obvious directions: Up.

I see: a grass shack, sand, a
lot of ocean.

OK,
```

```
I'm in a small grass shack.

Obvious directions: East.

I see: Trader Jack the
beachcomber, some keys on a
chain, a machete.

Trader Jack says - Hi Bub! Got
somethin' to trade?
OK,
```

Actual photographs taken from Calixto Island screen.

CALIXTO ISLAND

New Hi-Res Version

A challenging puzzle with an occasional twist of humor. You'll visit a secret laboratory, a Mayan pyramid and you'll meet crazy Trader Jack—all in living color and exciting detail. A classic!

BLACK SANCTUM

New Hi-Res Version

Encounter the forces of black magic as you roam around an old 18th century monastery. You'll see all the evil locations in this spooky adventure in full hi-res detail. If you enjoy suspense, this one's for you.

OTHER GREAT GAMES FROM MARK DATA

BUMPERS

Tension mounts as you wildly race through a hidden obstacle course. Barrier walls are invisible until you bump into them and you must proceed cautiously as each dead end has a hidden booby trap. Especially exciting when two players compete simultaneously.

COSMIC CLONES

Clonial Warriors, Super-Klones, Double Bombs and "the Death Layer" relentlessly challenge the most skillful player in this unique, fast action game. This is one of our favorites.

GLAXXONS

Pit your playing skill against squadrons of swooping, diving spacecraft. Fast and furious with seven selectable skill levels and automatic game acceleration. . .guaranteed to blister your joystick finger.

EL BANDITO

El Bandito has to be a crafty little hombre to stay alive as he loots the local countryside. Escape into a tunnel to avoid that angry spider. . .race around the corner towards your lair. Two players may compete simultaneously in this unusual game.

All games: Cassettes ... $24.95 ea. Discs ... $27.95 ea. 16K Required

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option of rolling or passing the dice.

At this time, the first bet is made; the roller can bet any amount of $1 or more. The second player can bet any amount up to the first player's bet, and the third player can bet any or all of the remaining amount.

Press the spacebar to roll your dice. Rolling a seven or 11 on first roll wins, and a two, three or 12 on your first roll loses. Any other number which comes up on first roll is known as your "point." (At this time you may make a second bet.) You must roll this number again before rolling a seven in order to win. This is called making your point. The computer will keep track of the money in the pot, the bets on each turn, and each player's win and loss totals.

If you enter only one name at the outset of play, you'll be rolling against Mr. Big, Casino CoCo's public relations officer and chief debt collector. A prudent self restraint is advised when betting against Mr. Big.

The last lines of the program have been added for your convenience in making extra saves; just type *RUN 10000* and [ENTER], making sure your cassette system is ready, of course.

So, that's all there is to it. Welcome to Casino CoCo, where the drinks are free, the company lovely, and complimentary chips are waiting for you at the hospitality booth. Relax and enjoy, and if you need anything, just ask for Mr. Big. He won't be hard to find; he has his eye on you already.

—Courtney Noe

140	64	2230	79
490	112	2570	33
870	91	2960	234
1300	228	3320	229
1640	90	END	103
1930	211		

```
1 CLS1
2 PRINT@170,"*COPYRIGHTED*"
3 PRINT@231,"**DAN DROUILLARD**"
5 GOSUB3120
10 P=0
20 GOTO710
30 CLS3
40 PRINT@128,"          HOW MANY PL
AYERS?":INPUT XX:CLS3
50 IFXX>3THENPRINT@193,"SORRY, O
NLY THREE OR LESS CAN       PLAY
":GOSUB 3120:CLS3:GOTO 40
60 PRINT@128,"          WHAT'S YOUR
 NAME?"
70 PRINT@192,"          PLAYER 1":I
NPUT A$
80 IFXX=1THENPRINT@256,"           P
LAYER 2 MR. BIG ":GOSUB3120:B$="
MR. BIG":GOTO120
90 PRINT@256 ,"         PLAYER 2":
INPUT B$
100 IFXX=2THENGOTO120
110 PRINT@320,"         PLAYER 3":
INPUT C$
120 PRINT@416, "            VERY GO
OD !!"
130 GOSUB3120
140 CLS3:PRINT@128," OKAY, "A$",
":PRINT@160," THE DICE ARE YOURS
.":IF A$="MR. BIG" THEN GOSUB 33
00:T=0:GOSUB3120:GOTO260
150 PRINT@352," DO YOU WANT TO P
ASS THE DICE?    Y/N"
160 Z$=INKEY$
170 IF Z$="Y" AND XX=1 THEN GOSU
B 2970:GOTO140
180 IF Z$="Y" AND XX=2 THEN GOSU
B 2970:GOTO 140
190 IF Z$="Y" AND XX=3 THEN GOSU
B 2880:GOTO 140
200 IF Z$="N" THEN GOTO 220
210 GOTO 160
220 T=0
230 CLS3
240 PRINT@192,"            MAKE YOU
R BET"
250 INPUTA(1)
260 CLS3
265 IF A(1)<1 ANDA(1)>.01 THEN P
RINT@192,"        MINIMUM BET $1.
00":FOR RY=1TO700:NEXT RY:GOTO 2
40
270 PRINT@128," THERE'S "A(1)" D
OLLARS"
280 PRINT@160," IN THE POT--" B$
"--"
290 PRINT@256,"          MAKE YOUR
BET"
300 IFA$="MR. BIG"THENGOTO320
310 IFXX=1THENGOSUB3340:PRINT@35
2,"     I'LL COVER  "B(1) "DOLLA
RS":FORX=1TO1200:NEXTX:GOTO330
320 INPUTB(1)
330 IFB(1)>A(1)THENGOSUB3130:GOT
O270
340 D=A(1)-B(1)
350 CLS3
360 IFXX=<2THENGOTO430
370 PRINT@128," THERE'S "D" DOLL
ARS"
380 PRINT@160," IN THE POT--"C$"
--"
390 PRINT@256,"    MAKE YOUR BET
"
```

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```
400 INPUTC(1):IF C(1)>D GOSUB313
0:GOTO0370
410 D=D-C(1)
420 CLS3
430 PRINT@192,"  OKAY, "A$",  RO
LL THE DICE"
440 PRINT@384,"        --PRESS SP
ACE BAR--":FOR X=1 TO 1200:NEXT
X:GOTO 705
450 GOTO430
460 GOTO470
470 CLS3
480 PRINT@96," OKAY, "A$", YOU H
LAYER 2 MR. BIG ":GOSUB3120:B$="
MR. BIG":GOTO120
90 PRINT@256 ,"       PLAYER 2":
INPUT B$
100 IFXX=2THENGOTO120
110 PRINT@320,"       PLAYER 3":
INPUT C$
120 PRINT@416, "          VERY GO
OD !!"
130 GOSUB3120
AVE TO MAKE "
490 PRINT@128," YOUR POINT"
500 PRINT@192,"   YOUR POINT IS-
-"L(1)"--"
510 PRINT@256,"          MAKE YOU
R BET"
520 IFA$="MR. BIG"THENGOSUB3120:
GOSUB3430:CLS3:PRINT@256,"
 I BET--"A(2)"--DOLLARS":GOSUB31
20:GOTO540
530 INPUTA(2)
540 DD=D+A(2)
550 CLS3
560 PRINT@128," THERE’S  "DD"  D
OLLARS"
570 PRINT@160," IN THE POT---"B$
"---"
580 PRINT@256,"         MAKE YOUR
 BET"
590 IFB$="MR. BIG"THENGOSUB3370:
GOSUB3120:PRINT@352,"     I’LL C
OVER--"B(2)" DOLLARS":GOSUB3120:
GOTO610
600 INPUTB(2):IFB(2)>DD THENGOSU
B3130:GOTO560
610 DD=DD-B(2):CLS3
620 IFXX=2ORXX=1THENGOTO690
630 PRINT@128," THERE’S  "DD"  D
OLLARS"
640 PRINT@160," IN THE POT--"C$"
--"
650 PRINT@256,"        MAKE YOUR
BET"
660 INPUTC(2)
670 IFC(2)>DD THENGOSUB3130:GOTO
630
680 CLS3
```

```
690 PRINT@192,"   OKAY, "A$", RO
LL THE DICE"
700 PRINT@384,"         --PRESS SP
ACE BAR--":GOSUB3120
705 ZP=0
710 PMODE2,1
720 PCLS
730 SCREEN1,1
740 IFP=0THENGOSUB2340
750 T=T+1
760 LINE (0,140)-(80,100),PSET
770 LINE -(168,100),PSET
780 LINE -(255,140),PSET
790 LINE (0,152)-(80,104),PSET
800 LINE -(164,104),PSET
810 LINE -(255,152),PSET
820 LINE (0,156)-(80,106),PSET
830 LINE -(164,106),PSET
840 LINE -(255,156),PSET
850 DRAW"BM 118,64;D10;F2;R10;E2
;U12;H2;L10;G2;D2;R14;D2;G2;L10;
H2;U2"
860 DRAW "BM122,73;R6"
870 DRAW"BM 124,71;R2"
880 DRAW"BM 121,79;L8;D1;L4;D1;L
4;D1;G13;R6;D2;L4;R4;D2;L4;R4;D2
;L6;U9"
890 DRAW"BM 108,91;G8"
900 DRAW"BM 106,91;D9"
910 DRAW "BM 128,79;R6;D1;R4;D1;
R4;D1;F14;L6;D2;R4;L4;D2;R4;L4;D
2;R6;U9"
920 DRAW"BM 142,91;F10"
930 DRAW"BM 142,91;D9"
940 DRAW"BM120,76;D3"
950 DRAW"BM128,76;D3"
960 DRAW "BM 124,82;D2;G2;D14;R6
;U14;H2;L2;R2;U2;E2;G2;L2;H2;F2"
970 DRAW"BM118,68;L2;D4;R2
980 DRAW"BM 132,68;R2;D4;L2"
985 IF ZP=1 THEN D1=RND(6):D2=RN
D(6):GOTO 1050
990 S$=INKEY$
1000 D1=RND(6)
1010 D2=RND(6)
1020 IFS$=" "THENGOTO1050
1030 IFP=0THENGOTO1050
1040 GOTO990
1050 FORX=1TO200:NEXTX
1060 DRAW "C0; BM105,82;G13;R6;D
2;L4;R4;D2;L4;R4;D2;L6;U9"
1070 DRAW"BM 108,91;G10"
1080 DRAW"C1;BM 105,81;D10;R8;U4
;L4;D3;U3;L3;D3;U3;L3;D3;U3;"
1090 DRAW"C1;BM 115,90;D9"
1100 FORX=1TO200:NEXTX
1110 FORX=1TO3
1120 DRAW"C1;BM 102,86;D5;R8;U4;
L4;D3;U3;L3;D3;U3;L3;D3;U3"
1130 SOUND130,1
```

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ABC'S IN COLOR

In the ABC program, all 26 letters spring up in color to the familiar ABC tune. Then, colorful detailed pictures depicting each individual letter of the alphabet appear one by one. Your child's fascination will mount as he or she correctly presses the letter on the keyboard and is rewarded with a musical tune before the next detailed picture is drawn line by line onto the screen: AIRPLANE for A, BUS for B, CLOWN for C and so on to ZEBRA for Z. Truly a must program for the preschool to first grade age group!

CoCo 16K ECB . . . . . . Tape: $19.95 Disk: $25.95

CRISS—CROSS MATH

As the program begins, your child is presented with a nine square playing board. It is your choice as to which square you choose. After a choice is made, a MATH PROBLEM appears in the square. You score your first X by answering the problem correctly. If your answer is incorrect, the square clears and your opponent is allowed his choice of squares. The game is over when three squares vertically, horizontally, or diagonally are won by the same player. When playing against the computer, every answer you get wrong is won by the computer. Multi-level ADDITION AND SUBTRACTION program.

CoCo 16K . . . . Tape: $12.95

FRACTIONS

SIDE ONE: Fraction Lessons, explains fractions with the aid of graphics. Child studies the different ways fractions can be represented. Lessons include:

- IMPROPER FRACTIONS
- MIXED FRACTIONS
- PROPER FRACTIONS

Many educators have praised the use of motion and color to display the fractional equivalents.

SIDE TWO: Fraction practice, offers a random computer generated quiz.

Atari 16k . . . . Tape: $19.95
CoCo 16k . . . . Tape: $19.95

JOYSTICK DRAW

Joystick Draw is the simple way to explore your artistic talents! Program operation is easy enough for a child to use, but effective enough that TCE uses it to design many sophisticated high-resolution graphic screens. Joystick Draw's design allows you or your child to save those masterpieces for future revisions or for use in other programs (instructions included). Your child will spend many hours enjoying this program and at the same time improving his or her eye hand coordination! You will find Joystick Draw to be an easy way to design those more sophisticated graphics for your own programs!

CoCo 16 ECB . . . . Tape: $16.95

SPELL BOMBER

As captain of your ship, you must destroy the enemy bomber by spelling the mystery word. In this exciting and educational game the bomber gets closer with each inaccurate letter. You have only EIGHT tries to guess the mystery word or your ship will be bombed! If you guess the word correctly, GENERAL QUARTERS will sound and your ship will fire a missile to destroy the bomber, Three levels are available: EASY, MEDIUM, and HARD. Challenging for all ages!

Atari 16K . . . . Tape: $18.95
CoCo 16k ECB . . . . Tape: $18.95 Disk: $22.95
Vic 20 13k . . . . Tape: $18.95

SPELLING BEE

The word is pronounced vocally and it is up to you to type in the correct spelling. If wrong, the computer will be your friend and flash the word on the screen for just an instant. OK! Try typing the word in again. STILL WRONG! The computer wants success and allows you to see the word again this time a little longer. If you just can't spell the word, the computer realizes you need to learn to spell the word and leaves the word on the screen for you to copy. Try your best and the computer has a surprise for your reward!

SPELLING BEE I . . . GRADE 1 & 2	SPELLING BEE III . . . GRADE 5 & 6
SPELLING BEE II . . GRADE 3 & 4	SPELLING BEE IV . . . GRADE 7 & 8

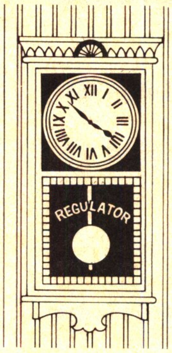
CoCo 16k ECB . . . . TAPE: $16.95 Each

TC—INVENTORY

Many insurance companies offer a discount for policy holders which have complete inventories on file. TC — Inventory is designed to help you organize, maintain, and compile the personal belongings of your home. Program is user friendly and menu driven. TC — Inventory allows input for location of item, price of item, serial number of item, date of purchase, and a text written description of the item. Don't put off recording your personal belongings until its too late. Requires printer for hard copy.

CoCo 32k ECB . . . . Tape: $16.95

TEACHING CLOCK



Torn between teaching time on a digital or a conventional (face and hands) clock? Well, this program combines the two using high resolution graphics and prompts! Your child will learn to tell time with the aid of a specially designed CLOCK! Child enters the time, if wrong, the center of the clock displays a graphic aid. If the child is correct a musical reward is heard. Program offers three levels: hours, quarter hours, and five minute intervals.

Apple 48k . . . . Disk: $19.95
Atari 32k . . . . Tape: $16.95
CoCo 16k ECB . . . . Disk: $19.95 Tape: $16.95

Additional Educational Software available for Color Computer, TDP 100, Atari ®, Apple ®, Commodore 64 ®, and VIC 20 ®

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```
1140 SOUND150,1
1150 DRAW"C0;BM102,81;D10;R8;U4;
L4;D3;U3;L3;D3;U3;L3;D3;U3"
1160 SOUND130,1
1170 NEXT X
1180 DRAW"C0;BM105,81;D10;R8;U4;
L4;D3;U3;L3;D3;U3;L3;D3;U3"
1190 DRAW "C0;BM 108,91;G10"
1200 DRAW"C1;BM107,81;D30;R8;U20
"
1210 DRAW"C0;BM108,100;R7"
1220 DRAW "C0;BM108,104;R7"
1230 DRAW"C0;BM108,106;R7"
1240 DRAW"C1;BM 108,111;G7;F1;E5
;D5;R2;D2;R5;U2;R2;U6;H2"
1250 DRAW"C1;BM108,113;R3;D3;L3;
U3"
1260 DRAW"C1;BM113,115;R3;D3;L3;
U3"
1270 FOR X=1 TO100:NEXTX
1280 DRAW "C0;BM108,113;R3;D3;L3
;U3"
1290 DRAW"C0;BM113,115;R3;L3;D3;
R3"
1300 DRAW"C1;BM102,130;E4;F4;G4;
H4"
1310 DRAW"C1;BM118,130;E4;F4;G4;
H4"
1320 FOR X=1 TO100:NEXTX
1330 DRAW"C0;BM102,130;E4;F4;G4;
H4"
1340 DRAW"C0;BM118,130;E4;F4;G4;
H4"
1350 DRAW"C1;BM95,145;R5;D5;L5;U
5"
1360 DRAW"BM125,145;R5;D5;L5;U5"
1370 FORX=1TO50:NEXTX
1380 DRAW"C0;BM95,145;R5;D5;L5;U
5"
1390 DRAW"BM125,145;R5;D5;L5;U5"
1400 DRAW"C1;BM135,160;R8;D8;L8;
U8"
1410 DRAW"C1;BM85,160;R8;D8;L8;U
8"
1420 FORX=1TO200:NEXTX
1430 DRAW"C0;BM 85,160;R8;D8;L8;
U8"
1440 DRAW"C0;BM135,160;R8;D8;L8;
U8"
1450 FORX=40TO90STEP10
1460 SOUNDX,1
1470 NEXTX
1480 DRAW"C1;BM48,184;U48;E4;R48
;F4;D48;G4;L48;H4"
1490 DRAW"BM140,184;U48;E4;R48;F
4;D48;G4;L48;H4"
1500 IFD1=1THENGOSUB1590
1510 IFD1=2THENGOSUB1570:GOSUB15
80
1520 IFD1=3THENGOSUB1570:GOSUB15
80:GOSUB1590
1530 IFD1=4THENGOSUB1570:GOSUB15
80:GOSUB1600:GOSUB1610
1540 IFD1=5THENGOSUB1570:GOSUB15
80:GOSUB1590:GOSUB1600:GOSUB1610
1550 IFD1=6THENGOSUB1570:GOSUB15
80:GOSUB1600:GOSUB1610:GOSUB1620
:GOSUB1630
1560 GOTO1640
1570 DRAW"BM56,140;R8;D8;L8;U8":
RETURN
1580 DRAW"BM88,172;R8;D8;L8;U8":
RETURN
1590 DRAW"BM72,156;R8;D8;L8;U8":
RETURN
1600 DRAW"BM88,140;R8;D8;L8;U8":
RETURN
1610 DRAW"BM56,172;R8;D8;L8;U8":
RETURN
1620 DRAW"BM56,156;R8;D8;L8;U8":
RETURN
1630 DRAW"BM88,156;R8;D8;L8;U8":
RETURN
1640 IFD2=1THENGOSUB1780
1650 IFD2=2THENGOSUB1760:GOSUB17
70
1660 IFD2=3THENGOSUB1760:GOSUB17
70:GOSUB1780
1670 IFD2=4THENGOSUB1760:GOSUB17
70:GOSUB1790:GOSUB1800
1680 IFD2=5THENGOSUB1760:GOSUB17
70:GOSUB1780:GOSUB1790:GOSUB1800
1690 IFD2=6THENGOSUB1760:GOSUB17
70:GOSUB1790:GOSUB1800:GOSUB1810
:GOSUB1820
1700 IFD2=6THENGOSUB1760:GOSUB17
70:GOSUB 1790:GOSUB 1800:GOSUB 1
810:GOSUB 1820
1710 GOSUB3120
1720 M$=INKEY$
1730 IFM$="P"THENP=1:GOTO030
1740 IFP=0THENGOSUB2340:GOSUB312
0:GOTO0710
1750 GOTO1830
1760 DRAW"BM148,140;R8;D8;L8;U8"
:RETURN
1770 DRAW"BM180,172;R8;D8;L8;U8"
:RETURN
1780 DRAW"BM164,156;R8;D8;L8;U8"
:RETURN
1790 DRAW"BM180,140;R8;D8;L8;U8"
:RETURN
1800 DRAW"BM148,172;R8;D8;L8;U8"
:RETURN
1810 DRAW"BM148,156;R8;D8;L8;U8"
:RETURN
1820 DRAW"BM180,156;R8;D8;L8;U8"
:RETURN
1830 IFT=>2THENL(2)=D1+D2:GOTO19
70
```

T.A.G.

THE ADVENTURE GENERATOR

by Bill Cook

HERE IT IS — THE FIRST COMMERCIALLY AVAILABLE ADVENTURE GENERATOR FOR THE COLOR COMPUTER.

Now you can create your own exciting ADVENTURES without the hassle and bother of hours of tedious programming. Each ADVENTURE will be a stand-alone, ready to run program with up to 100 different and distinct rooms or locations and as many of 60 objects to be picked up, examined, or used by the player. Your devious mind can use up to 30 command words and 9 conditional flags in creating your mind boggling ADVENTURE. When finished, the ADVENTURE GENERATOR will output your ADVENTURE to either disk or cassette, as you desire.

With the ADVENTURE GENERATOR you can create and exchange ADVENTURES with your friends, or even sell them if you want without any fear of royalty requirements or other obligations. Start a club to exchange ADVENTURES, or make a few dollars by sending your best ones to a magazine for publication!

While you do not need to be an expert programmer to use the ADVENTURE GENERATOR, you should have a working knowledge of program syntax and format to use it most effectively. The ADVENTURE GENERATOR is fully compatible with all models of the Color Computer with the exception of the MC-10.

FEATURES

Creates stand-alone programs

Up to 100 rooms, 60 objects, 30 command words, and 9 conditional flags

Supports tape and disk output

Optional printer output of important sections during creation of ADVENTURE

Complete documentation

Includes sample ADVENTURE

Works with all models of the CoCo except MC-10

Requires 32K Extended Color BASIC

Cassette......$34.95
Disk/Amdisk......$39.95

COD orders accepted, no charge cards please.
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DOUBLE
INTERFACE

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Allows the composite video signal to be interfaced directly to a B/W or color monitor. TV and monitor can be used simultaneously. Complete with comprehensive instructions and all parts, including an external sound output.

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WHERE'S-IT

by C.E. Laidlaw

What programs are on this disk? Which disk is my WIDGET program? WHERE'S-IT will answer these questions for you and maintain disk directory index files with up to 948 programs in each. Completely user-friendly, just run WHERE'S-IT and follow the prompts to:

Create index files holding up to 948 programs

Load or save existing index files

Add, delete or update index files for a specific disk

Sort index files alphabetically with a machine language sort

List index files to screen

Print index out with 162 programs to the page

Disk/Amdisk.....$19.95
(32K Extended Color BASIC)

Double Density Software

COLOR TERM + PLUS +

If you're looking for the finest terminal software you can buy, look no further! And now we've added a **high-res screen** display that gives you 32 by 16, 42, 51, or 64 by 24 lines.* And you can switch between the high-res screen and the normal screen ***without*** destroying what you have in the buffer! + **PLUS** + we have a buffer editor, complete up and down load support, on-line cassette or disk reads and writes, off-line and on-line scrolling, pre-entry of data before calling, word wrap, buffer printing, selective printing, change **any** parameter so you can communicate with **any** other computer. You can send and receive Basic programs, ASCII file, as well as machine code, + **PLUS** + you can save your buffer to tape (Tape or Rom version) or disk (Disk version). You can communicate with the local **BBS, Compuserve™, The Source™,** the main frame at work or school, other color computers, Apples, IBM PC's, TRS-80 Model I, II, III, IV, 12, 16, 100, or any other computer via RS-232.

Compare these features with ***any*** other terminal program:

32 x 16, 42, 51, 64 x 24 Screen
Communications BAUD Rate: 110-19200
Printer Baud Rate: 600-9600
Select Half or Full Duplex.
Select Odd, Even, or No Parity.
Select 7 or 8 Bit Words.
Send Control Characters.
Send a True Line Break.
Separate Keys for Escape and Rubout.
Select All Caps If Needed.
Word Wrap — Eliminate Split Words. (32 Character Mode)
Selectable Reverse or Normal Video. (32 Character Mode)

NOW WITH 42, 51 OR 64 CHARACTERS BY 24 LINES!

Scroll Protect Up to 9 Lines.
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Has Programmable Prompt for ''Send Next Line!!
Buffer Size Indicator.
Complete Up and Down Load Support.
Improved Buffer Editor.
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On/Off Cassette or Disk Reads and Writes.
Pre-Enter Data Before Going On-Line.
Save/Load Machine Code, Basic Programs or Files.
Select Printer Line Feeds If Needed or Ignore All Line Feeds in Buffer.

*Disk and Rom Pack only (not on tape). PRICE: $29.95 (TAPE) $39.95 (ROM PACK) $39.95 (DISK)

DOUBLE SPOOLER

NEW

Tired of waiting for your listings? printouts? etc.? This is THE Spooling Program!! No need to save your programs in ASCII. You can also spool your files and you can spool **ANYTHING** you print on the screen while a program is running!! Requires a minimum of 32K **AND** the 64K computer can spool really **LARGE** files!! Plus more!!
PRICE: $19.95 (Tape) $21.95 (Disk)

DOUBLE MEM-DISK

NEW

Use that **32K** of unused memory in your **64K** computer for something useful! Store programs in memory and recall them anytime you need them!! Here is a list of the new commands you can enter right from the keyboard:

MSAVE — Save the program in memory.
MLOAD — Load a named program.
MKILL — Kill a program stored in memory.
MDIR — List all programs stored in memory.
MFILE — Merge a program in high mem with current program in low memory.

Those of you with tape systems will have several programs in memory at once so you don't have to wait on that **SLOW** tape system **AND** those of you with disk systems will be able to use that extra space that is going to waste!!
PRICE: $24.95 (Tape) $26.95 (Disk)

DOUBLE CABLE

Tired of switching cables everytime you use your modem and printer? This is the fix!! Hook your modem and printer up at the same time! No more switching.
PRICE: $14.95

$2.00 shipping and handling on all orders. $3.00 charge on C.O.D. orders, Mastercard and VISA accepted. Texas residents add 5% sales tax. Allow two weeks for personal checks.

Double Density Software
920 Baldwin Street
Denton, Texas 76201
Phone 817/566-2004.

DOUBLE SWITCH

NEW

Now you can switch between two different devices **AND** you get an on/off indicator at the same time. Switch your **Modem & Printer** or two printers, etc.
PRICE: $29.95

DOUBLE DOS BASIC

NEW

364,000 BYTES!

That's right! Using your 64K Color Computer, and an 80 track drive, you too can have more than **TWICE** as much storage on your disk drive system. **DOUBLE DOS BASIC** allows you to use 35, 40 or 80 track (**double** or single sided) drives all on one system, all at the same time! Your system could consist of a 35 track drive, a two drive AMDEK system, and an 80 track drive, all working, and hooked up to your system! (The AMDEK drives are 40 track drives.) **ALL** commands are supported in **DOUBLE DOS BASIC.** The DOS is **totally** transparent to your BASIC programs! If your system selection is 80 tracks, a PRINT FREE command will return **158** granules! Compare this to the 68 granules your system now returns! The 40 track drives would return 78 granules, 10 more than the 35 track system. **EVERY** command in BASIC is supported by **DOUBLE DOS BASIC.** If you haven't already upgraded to 64K, now is the time! Use your system to its **FULLEST! DOUBLE DOS BASIC** also gives you RESET PROTECTION, unlike most of the other **64K** programs. **AND,** used with our ROM MOVE program, you can also get another 8000 bytes of BASIC addressable memory!
DOUBLE DOS BASIC — $24.95
DOUBLE DOS & ROM MOVE — $24.95

PROFESSIONAL PROFESSIONAL PROFESSIONAL PROFESSIONAL

PROFESSIONAL

REAL EIGHTY-COLUMN DISPLAY!

ULTRA TERM +

NEW NEW

PROFESSIONAL

PROFESSIONAL PROFESSIONAL PROFESSIONAL PROFESSIONAL

This program is the **ultimate** in coco communicating!! ***Ultra* Term +** is used with a plug-in 80 column board* that gives you **True** 80 columns, not the graphics display that is unreadable at 80 columns. This is truly a ***Professional*** Package that is so easy to use that once you have used it, you'll wonder why other packages are so difficult to use, (except for Color Term + Plus + that is!) After using a terminal program that cannot give you **True** mainframe terminal emulation, you will find ***Ultra* Term +** indispensable! ***Ultra* Term +** even has a host mode that allows you to echo characters like full duplex mainframes do! There are also 10 macro keys which will allow you to save passwords, phone numbers, modem programming information, etc. + PLUS + you can save them to tape (Rom Pack, Tape Versions) or disk (Disk Version). Also, like all ***Professional*** terminal programs you can save your current parameters. This saves you set up time when moving from one system to another. + Plus + when used with the parallel printer port** you can print either what is coming in, or print what you saved in your space buffer (64K systems only support the space buffer option) if you like. And what about documentation? Every feature is explained in detail and indexed for fast look up! There is also a comprehensive help section to aid those unfamiliar with telecommunications. Although this program was designed for the Professional a total novice can use it with ease. Check all the features listed below and then you decide who has the world's smartest terminal!

Baud Rates: 110-4800 (communicate)
600-9600 (printer).
Screen Format: 80 x 25 w/true upper & lower case.
Select half, full duplex or echo.
Select odd, even, mark, space or no parity.
Send all 128 characters from keyboard.
Select 7 or 8 bit words.
Select 1 or 2 stop bits.
Send a true line break.
Select all caps if needed.
Automatic capture of incoming files.
X on/X off capabilities.
Merge text or programs in buffer.
53,000 character buffer (64**K**).
Split buffer option (64**K**).
10 macro keys.
Four buffer send modes (dump, prompted, manual & time delay).
Buffer size indicators (bytes used & bytes remaining).
Buffer editor w/auto key repeat.
Scroll forward & reverse to view buffer & print viewed screen option.
Selectable printer formats (line feeds, etc.).
Selectable trapping of incoming characters.
Print while receiving data*.
Spool received data while receiving more (64K).
Buffer editor has these features:
Move forward and reverse through buffer. Insert, type over, delete lines or characters.
Block deletion or start to end of buffer delete.
Save and load macros.
Save and load parameters.
Use 1-4 disk drive (w/SAVE, LOAD, DIR. & granule display).
Easy to use MENU driven format.
Comprehensive users manual.
Works with **ALL** Radio Shack™ Disk Systems and **all** models of color computers.

Still not convinced? How about a 15 day, money back guarantee? If you don't like the package for any reason, we will refund your money upon return of a like-new package.† Who out there is offering you this kind of deal? And customer support was never better. Simply fill out your registration card and send it back to us and you will be notified when new features, improvements, etc. become available because all registered owners will receive **Free** upgrades for a $5.00 shipping and handling fee).

As with all good Professional programs, ***Ultra* Term +** is **all machine code.** This program has been tested by those both familiar and unfamiliar with communications programs. And when you call for some technical support, you **won't** get an answering machine during our business hours (10-5 CST M-Sat.) under normal circumstances. Technical help is usually available all day.

Note: Color Term + PLUS + should have all of the same capabilities described above by the time you read this ad, but call first to make sure. ***Ultra* Term +** is ready to ship **now.**

PRICE: *Ultra* Term + — $55.95 (Disk/Tape)
Color Term + Plus + (V5.0) $45.95 (Disk/Tape)
Word·Pak (Includes a software driver so you can use your basic programs with no modification in most cases!)...**$139.95** + $3.00 S&H
Y-Cable...**$29.95** (Required if expansion port not used with disk drives)

Complete Package ***Ultra* Term +**, Word·Pak & Y Cable [subtract $20.00 if not needed] is only **$210.00**

****Ultra* Term +** supports the 80 column board made by PBJ, Inc. If you already have the board, simply order the program, but those of you who don't can get a good deal.

**Parallel Printer Port from PBJ, Inc.

†Less $10.00 restocking charge.

Canadians
Kelly Software Distributors Ltd.
P.O. Box 11932
Edmonton, Alberta.
(403) 421-8003

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Phone 817/566-2004.

VISA

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WRITTEN FOR USE BY THE NON-ACCOUNTING ORIENTED BUSINESSMAN
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PROFESSIONALLY WRITTEN AND FULLY TESTED
HIGHLY USER FRIENDLY AND MENU DRIVEN
AFTER THE SALE SUPPORT

SMALL BUSINESS ACCOUNTING (Version 2.0) This sales-based accounting package is designed for the non-accounting oriented businessman. It also contains the flexibility for the accounting oriented user to set up a double entry journal with an almost unlimited chart of accounts. This package includes Sales Entry, transaction driven Accounts Receivable and Accounts Payable, Journal Entry, Payroll Disbursement, and Record Maintenance programs. Screen and hardcopy system outputs include Balance Sheet, Income Statement, Customer and Vendor Status Reports, Accounts Receivable and Payable Aging Reports, Check Register, Sales Reports, Account Status Lists, and a Journal Posting List. The number of accounts is limited only by the number of disk drives. $89.95

ACCOUNTS RECEIVABLE (Version 2.0) This package is designed to meet the requirements of most small business users. The system includes detailed audit trails and history reports for each customer, prepares invoices and monthly statements, mailing labels, aging lists, and an alphabetized customer listing. The user can define net terms for commercial accounts or finance charges for revolving accounts. This package functions as a standalone A/R system or integrates with the Small Business Accounting package to build a complete accounting/receivables system. $59.95

PAYROLL (Version 2.0) This integratable package is designed for maintaining personnel and payroll data for up to 200 hourly and salaried employees with 8 deductions each. This system calculates payroll and tax amounts, prints checks and maintains year-to-date totals. These amounts can be automatically transferred to the SBA package for financial reporting. It computes each pay period's totals for straight time, overtime, and bonus pay and determines taxes to be withheld. Additional outputs include mailing list, listing of employees, year-to-date federal and/or state tax listing, and a listing of current misc. deductions. This system is suited for use in all states except Oklahoma and Delaware. $69.95

All programs require a minimum of 32K and 1 disk drive but will take advantage of 64K and multiple drives. Each package features a hi-res 51 x 24 black on green screen. 16K versions available without hi-res screen. Specify 16K or 32K versions when ordering. Future integrated packages will include: Inventory Control, Sales Analysis, Accounts Payable.

INCLUDE $5.00 Shipping/Handling Per Order

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COLOR SOFTWARE SERVICES DIV.

BUSINESS SOFTWARE GROUP
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```
1840 L(1)=D1+D2
1850 IFL(1)=4OR L(1)=5ORL(1)=6OR
L(1)=8ORL(1)=9ORL(1)=10THENGOTO4
60
1860 IFL(1)=2THENGOSUB2050:GOSUB
2140:GOSUB2190:GOSUB2390:GOSUB24
50:GOSUB3120:GOSUB2740:INPUTZZ:G
OSUB2630:INPUTZZ
1870 IFL(1)=2ANDXX=3THENGOSUB288
0:GOTO140
1880 IFL(1)=2THENGOSUB2970:GOTO1
40
1890 IFL(1)=3THENGOSUB2050:GOSUB
2230:GOSUB2190:GOSUB2390:GOSUB24
50:GOSUB3120:GOSUB2740:INPUTZZ:G
OSUB2630:INPUTZZ
1900 IFL(1)=3ANDXX=3THENGOSUB288
0:GOTO140
1910 IFL(1)=3THENGOSUB2970:GOTO1
40
1920 IFL(1)=7ORL(1)=11THENGOSUB2
050:GOSUB2270:GOSUB2390:GOSUB242
0:GOSUB3120:GOSUB2490:INPUTZZ:GO
SUB2630:INPUTZZ:GOTO140
1930 IFL(1)=12THEN GOSUB2050:GOS
UB2060:GOSUB2090:GOSUB2390:GOSUB
2450:GOSUB3120:GOSUB2740:INPUTZZ
:GOSUB2630:INPUTZZ
1940 IFL(1)=12ANDXX=3THENGOSUB28
80:GOTO140
1950 IFL(1)=12THENGOSUB2970:GOTO
140
1960 GOSUB3120:GOTO140
1970 IFL(2)=7THENGOSUB2050:GOSUB
2340:GOSUB2390:GOSUB2450:GOSUB31
20:GOSUB2740:INPUT ZZ: GOSUB2630
:INPUTZZ
1980 IFL(2)=7AND XX=3THENGOSUB28
80:GOTO140
1990 IFL(2)=7THENGOSUB2970:GOTO1
40
2000 IFL(2)=L(1)THENGOTO2030
2010 IFT=>1THENL(3)=L(1)
2020 GOTO3040
2030 IFL(2)=L(1)THENGOSUB2390:GO
SUB2420:GOSUB3120:GOSUB2490:INPU
TZZ:GOSUB2630;INPUTZZ:GOTO140
2040 ZP=1:GOTO 710
2050 DRAW"C1;BM16,4;R116;D24;L11
6;U24":RETURN
2060 DRAW"BM18,8;R8;F2;D4;G2;L6;
U8;D16;L2;R8;E2;U4;H2"
2070 DRAW"BM36,8;R4;F2;D12;G2;L4
;H2;U12;E2"
2080 LINE(48,8)-(56,24),PSET:LIN
E(56,8)-(48,24),PSET:RETURN
2090 DRAW "BM74,10;H2;L4;G2;D12;
F2;R4;E2"
2100 DRAW"BM80,24;U14;E2;R4;F2;D
6;L8;R8;D8"
2110 DRAW"BM94,24;U16;R6;F2;D4;G
2;L6;R4;F4;D4"
2120 DRAW"BM108,22;F2;R4;E2;U4;H
2;L4;H2;U4;E2;R4;F2"
2130 RETURN
2140 DRAW "BM20,22;F2;R4;E2;U4;
H2;L4;H2;U4;E2;R4;F2"
2150 LINE(32,24)-(32,8),PSET:LIN
E-(40,24),PSET:LINE-(40,8),PSET
2160 DRAW "BM44,24;U14;E2;R4;F2;
D6;L8;R8;D8"
2170 DRAW "BM56,24;U16;D8;E8;G8;
F8"
2180 DRAW"BM76,8;L8;D8;R4;L4;D8;
R8":RETURN
2190 DRAW"BM92,8;L8;D8;R4;L4;D8;
R8"
2200 DRAW"BM96,8;D8;R4;D8;U8;R4;
U8"
2210 DRAW"BM116,8;L8;D8;R4;L4;D8
;R8"
2220 DRAW"BM120,22;F2;R4;E2;U4;H
2;L4;H2;U4;E2;R4;F2":RETURN
2230 DRAW "BM28,10;H2;L4;G2;D12;
F2;R4;E2"
2240 DRAW"BM36,8;L2;G2;D12;F2;R4
;E2;U12;H2;L2"
2250 DRAW"BM50,8;L2;G2;D12;F2;R4
;E2;U2"
2260 DRAW"BM58,24;U16;D8;E8;G8;F
8":RETURN
2270 LINE(20,24)-(20,8),PSET:LIN
E-(28,24),PSET:LINE-(28,8),PSET
2280 DRAW"BM34,24;U14;E2;R4;F2;D
6;L8;R8;D8"
2290 DRAW"BM50,24;U16;L4;R8"
2300 DRAW"BM58,8;D14;F2;R4;E2;U1
4"
2310 DRAW"BM72,24;U16;R6;F2;D4;G
2;L6;F8"
2320 DRAW"BM86,24;U14;E2;R4;F2;D
6;L8;R8;D8"
2330 DRAW"BM102,8;D16;R8":RETURN
2340 DRAW"BM34,10;H2;L4;G2;D12;F
2;R4;E2"
2350 DRAW"BM40,24;U16;R6;F2;D4;G
2;L6;F8"
2360 DRAW "BM54,24;U14;E2;R4;F2;
D6;L8;R8;D8"
2370 DRAW"BM70,24;U16;R6;F2;D4;G
2;L6"
2380 DRAW"BM84,22;F2;R4;E2;U4;H2
;L4;H2;U4;E2;R4;F2":RETURN
2390 DRAW"BM160,28;D6;F2;R2;D8;U
8;R2;E2;U6"
2400 DRAW"BM178,28;L2;G2;D12;F2;
R4;E2;U12;H2;L2"
2410 DRAW"BM188,28;D14;F2;R4;E2;
U14":RETURN
2420 DRAW"BM206,28;D16;E4;F4;U16
```

```
"
2430 DRAW"BM220,28;D16"
2440 LINE(226,44)-(226,28),PSET:
LINE-(234,44),PSET:LINE-(234,28)
,PSET:RETURN
2450 DRAW"BM204,28;D16;R8"
2460 DRAW"BM220,28;L2;G2;D12;F2;
R2;E2;U12;H2;L2"
2470 DRAW "BM228,42;F2;R4;E2;U4;
H2;L4;H2;U4;E2;R4;F2"
2480 DRAW"BM250,28;L8;D8;R4;L4;D
8;R8":RETURN
2490 A(4)=A(4)+((B(1)+B(2))+(C(1
)+C(2)))
2500 B(4)=B(4)-(B(1)+B(2))
2510 C(4)=C(4)-(C(1)+C(2))
2520 CLS3
2530 PRINT@128,"  "B$", YOU OWE
"A$
2540 PRINT@160,"  "B(1)+B(2)" DO
LLARS"
2550 IFXX=2THENGOTO2590
2560 IFXX=1THENGOTO2590
2570 PRINT@224,"  "C$", YOU OWE
"A$
2580 PRINT@256,"  "C(1)+C(2)" DO
LLARS"
2590 PRINT@320,"         PAY UP F
OLKS!!"
2600 PRINT@448,"           PRESS
ENTER"
2610 A(2)=0:B(2)=0:C(2)=0
2620 RETURN
2630 CLS3
2640 IFA(4)<0.1THENPRINT@128,"
"A$", YOU'RE BEHIND"ELSEPRINT@12
8,"  "A$", YOU'RE AHEAD"
2650 PRINT@160,"  "A(4)" DOLLARS
"
2660 IFB(4)<0.1THENPRINT@224,"
"B$", YOU'RE BEHIND"ELSE PRINT@2
24,"  "B$", YOU'RE AHEAD"
2670 PRINT@256,"  "B(4)" DOLLARS
"
2680 IFXX=2THENGOTO2720
2690 IFXX=1THENGOTO2720
2700 IFC(4)<0.1THENPRINT@320,"
"C$", YOU'RE BEHIND" ELSE PRINT@
320,"  " C$", YOU'RE AHEAD"
2710 PRINT@ 352,"  "C(4)" DOLLAR
S"
2720 PRINT@448,"          PRESS
ENTER"
2730 RETURN
2740 A(4)=A(4)-((B(1)+B(2))+(C(1
)+C(2)))
2750 B(4)=B(4)+(B(1)+B(2))
2760 C(4)=C(4)+(C(1)+C(2))
2770 CLS3
2780 PRINT@128,"  "A$ ", YOU OWE
 "
2790 PRINT@160,"  "B$B(1)+B(2)"
DOLLARS"
2800 IFXX=1THENGOTO2850
2810 IFXX=2THENGOTO2850
2820 PRINT@224,"  "A$", YOU OWE
"
2830 PRINT@256,"  "C$ C(1)+C(2)"
 DOLLARS"
2840 PRINT@320,"          PAY UP
, "A$
2850 PRINT@448,"          PRESS
ENTER"
2860 A(2)=0:B(2)=0:C(2)=0
2870 RETURN
2880 F$=A$
2890 A$=B$
2900 B$=C$
2910 C$=F$
2920 F(4)=A(4)
2930 A(4)=B(4)
2940 B(4)=C(4)
2950 C(4)=F(4)
2960 RETURN
2970 F$=A$
2980 A$=B$
2990 B$=F$
3000 F(4)=A(4)
3010 A(4)=B(4)
3020 B(4)=F(4)
```

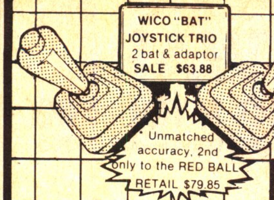
See Page 137

$18.95

- a lot of software for a little silver

WICO

COMMAND CONTROL


WICO "BAT" JOYSTICK TRIO
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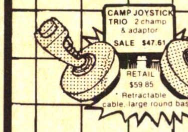
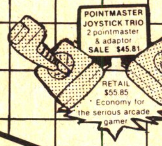
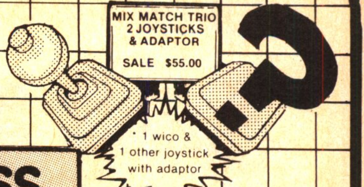
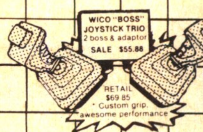

CAMP JOYSTICK TRIO 2 champ & adaptor
SALE $47.61
RETAIL $59.85
* Retractable cable, large round base


POINTMASTER JOYSTICK TRIO
2 pointmaster & adaptor
SALE $45.81
RETAIL $55.85
* Economy for the serious arcade gamer


MIX MATCH TRIO
2 JOYSTICKS & ADAPTOR
SALE $55.00
* 1 wico & 1 other joystick with adaptor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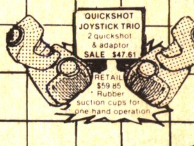
2 boss & adaptor
SALE $55.88
RETAIL $69.85
* Custom grip, awesome performance


QUICKSHOT JOYSTICK TRIO
2 quickshot & adaptor
SALE $47.61
RETAIL $59.85
* Rubber suction cups for one hand operation

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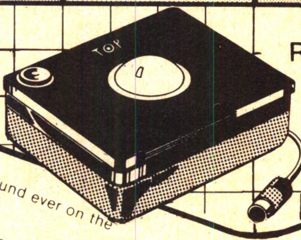

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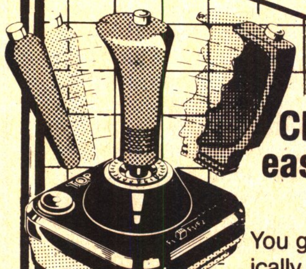

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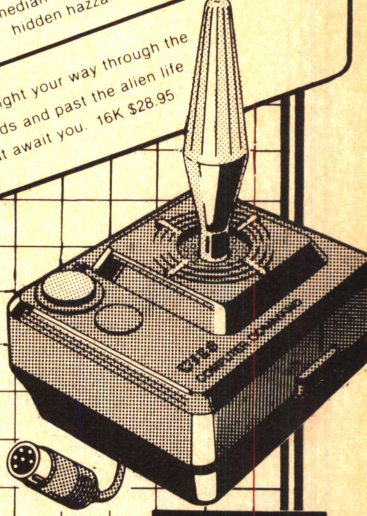

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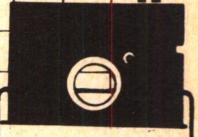

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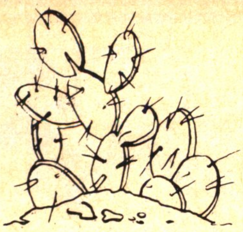

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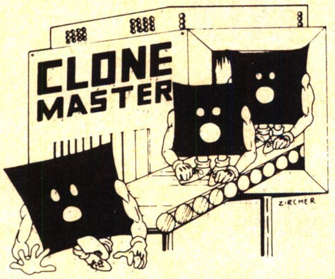
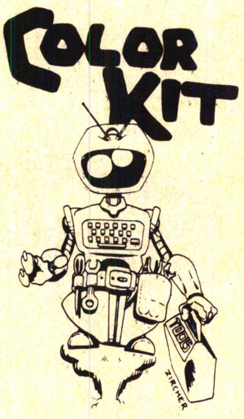


Clone Master

This is the ultimate disk backup utility, and who else but Prickly-Pear, originators of Omni-Clone, could bring it to you. If you are tired of waiting for your BACKUP command to finish, you'll like the speed of CLONE MASTER. This program checks the computer memory size, and if you have a 64K machine it will do a backup on a full disk in about 7 minutes — including formatting the destination disk — with only THREE swaps, not the seven you are used to, and if you are running multiple dirves, CLONE-MASTER will handle up to 4 double-sided drives. In addition, although we can't guarantee that CLONE MASTER will back up any disk, it can handle backups of most non-standard (protected) disks we have seen — not only on the Color Computer, but on Model III and IV, IBM PC, Kaypro, and Osborne. It handles up to 256 tracks, single and double density — even on the same track, CRC errors, and lots more. It even checks the speed of your drives for you! If you are using a disk drive, you know how disks will crash, so don't leave your valuable software unprotected any longer. Back it up or lose it! CLONE MASTER will adjust to any memory size and works with any version of the ROM's — including the JVC controller. **$39.95**

Colorkit

What can we say about the absolute best state-of-the-art programmer's utility. This program adds 35 commands to BASIC that should have been there all along and no short description will do it justice. Summary - light or dark screen, keyclick, screen editor, programmable keys, a super memory tool, variable listing, echo to printer, BREAK disable, convert machine language to DATA, global search, single step thru program run, double space printouts of program listings - that's less than half of what it will do. It takes about 6K of space, and if you have 64K you can put it up high and lose no BASIC space at all. 100% ML. Fully relocatable. See the great reviews in Nov. '83 issues of Hot Cocoa and Color Computer magazine. **Tape — $34.95; Disk — $39.95**



Tape Omni Clone

In the tradition of our famous Omni Clone for disk, we are proud to offer the fantastic Omni Clone for TAPE. As you know, good computer practice requires the making of backup copies of software to prevent loss. In the past that has often been difficult or impossible to do, even using some of the other tape backup programs available. This easy to use backup utility is suitable for any size Coco from 16 to 64K, and it automatically adjusts to the size memory you have. On a 64K system you can load about 62,500 bytes of various programs (about 6 to 8 average programs) before dumping them to a new tape. It easily handles programs with auto loaders, no headers, no EOF markers, unusual size data blocks, and many other unusual situations. As with our disk Omni Clone, we can't guarantee that this will back up any tape, but we haven't found many it won't handle, and we've tried dozens, including the toughest ones we could find. If you have any tapes in your collection you haven't backed up, now is the time to get your software collection protected — against loss. **On tape, but works on disk systems — $29.95**

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```
3030 RETURN
3040 GOSUB 3140
3050 IFL(3)=4THENGOSUB3230
3060 IFL(3)=5THENGOSUB3240
3070 IFL(3)=6THENGOSUB3250
3080 IFL(3)=8THENGOSUB3260
3090 IFL(3)=9THENGOSUB3270
3100 IFL(3)=10THENGOSUB3280
3110 GOSUB3120:GOTO2030
3120 FORX=1TO1000:NEXTX:CLS3:RET
URN
3130 PRINT@416,"   SORRY, THERE'
S NOT THAT MUCH              IN
 THE POT":FORX=1TO600:NEXT X:CLS
3:RETURN
3140 DRAW"BM40,12;D8;R4;D8;U8;R4
;U8"
3150 DRAW"BM 56,12;L2;G2;D12;F2;
R4;E2;U12;H2;L2"
3160 DRAW"BM 64,12;D14;F2;R4;E2;
U14"
3170 DRAW "BM 76,28;U16;R6;F2;D4
;G2;L6;F8"
3180 DRAW"BM 92,28;U16;R6;F2;D4;
G2;L6"
3190 DRAW"BM108,12;L2;G2;D12;F2;
R4;E2;U12;H2;L2"
3200 DRAW"BM 116,28;U16"
3210 LINE(120,28)-(120,12),PSET:
LINE-(128,28),PSET:LINE-(128,12)
,PSET
3220 DRAW "BM136,28;U16;L4;R8":R
ETURN
3230 DRAW"BM156,12;D8;R10;L2;U8;
D16":RETURN
3240 DRAW"BM164,12;L8;D8;R6;F2;D
4;G2;L4;H2":RETURN
3250 DRAW"BM164,14;H2;L4;G2;D12;
F2;R4;E2;U4;H2;L4;G2":RETURN
3260 DRAW"BM160,12;L2;G2;D4;F2;G
2;D4;F2;R4;E2;U4;H2;L4;R4;E2;U4;
H2;L2":RETURN
3270 DRAW"BM156,26;F2;R4;E2;U12;
H2;L4;G2;D4;F2;R6":RETURN
3280 DRAW"BM160,28;U16"
3290 DRAW"BM172,12;L2;G2;D12;F2;
R4;E2;U12;H2;L2":RETURN
3300 O=RND(6)*.1
3310 A(1)=A(4)*O
3315 A(1)=FIX(A(1))
3320 IF A(4)=<O THEN A(1)=25
3322 IF A(1)<5 THEN A(1)=5
3330 RETURN
3340 O=RND(6)*.1
3350 B(1)=A(1)*O
3355 B(1)=FIX(B(1))
3356 IFB(1)=0 THEN B(1)=A(1)
3360 RETURN
3370 IFL(1)=6THENB(2)=.1*DD
3380 IFL(1)=5ORL(1)=8THENB(2)=.2
*DD
3390 IFL(1)=4ORL(1)=9THENB(2)=.5
 *DD
3400 IF L(1)=3 OR L(1)=10 THEN B
(2)=.8*DD
3410 IFL(1)=2ORL(1)=12THENB(2)=D
D
3420 B(2)=FIX(B(2)):RETURN
3430 IFL(1)=6THENA(2)=.4*A(4):IF
A(2)>A(4)THEN A(2)=.4*A(1)
3440 IF L(1)=5 OR L(1)=8THEN A(2
)=.3*A(4):IF A(2)>A(4) THEN A(2)
=.3*A(1)
3450 IFL(1)=4ORL(1)=9THENA(2)=.2
*A(4):IFA(2)>A(4)THENA(2)=.2*A(1
)
3460 IFL(1)=3ORL(1)=10THENA(2)=.
1*A(4):IFA(2)>A(4)THENA(2)=.1*A(
1)
3470 IFL(1)=2ORL(1)=12THENA(2)=0
3480 A(2)=FIX(A(2)):RETURN
10000 CSAVE"CRAPS"
10005 MOTORON: FOR X = 1 TO 1000
:NEXT
 10010 CSAVE"CRAPS1"
 10015 MOTORON:FOR X = 1 TO 1000:
 NEXT
 10020 CSAVE"CRAPS2"
```

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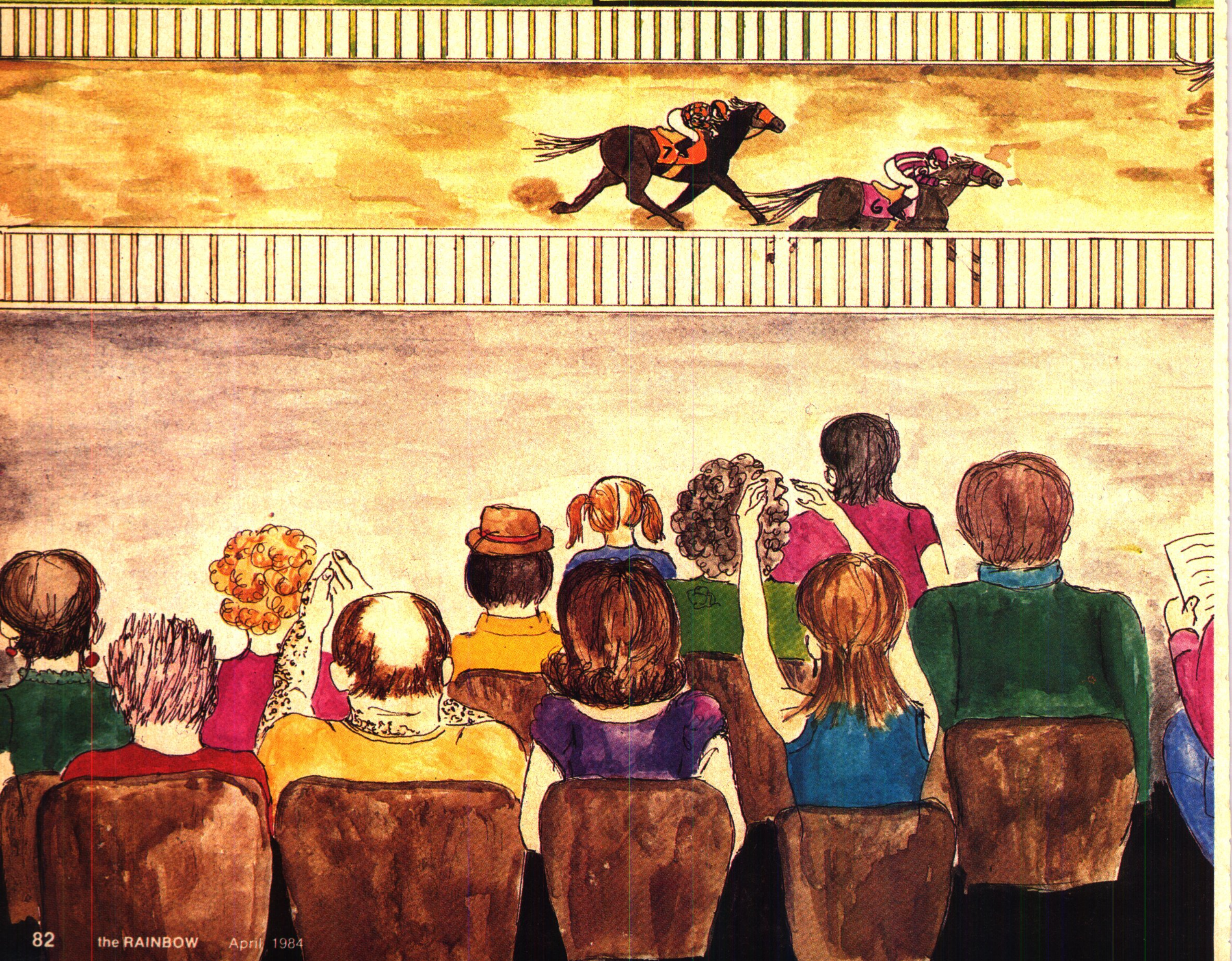
A Day At The Races

By George Bodiroga

A Day at the Races is a 16K Extended Color BASIC program that simulates horse racing. The program allows up to eight players (more if you have 32K), and the more players you have, the more fun it is. After *LOADing* and *RUNning* you will be asked to [ENTER] the number of players and all their names. After this is done the starting odds for the first race are displayed and the game begins.

Along with the odds, the race number, track condition and a comment for each horse are also displayed. Each player is then asked to enter the number of the horse that player wishes to bet on, the amount of the bet, and if it is a win, place, or show bet (you only need to enter a w, p, or s). Everybody starts out with $75 and the object is to have the most money at the end of 10 races.

After all the bets are entered, the final odds will be displayed. You will be paid off at these odds or more. For example, the real odds are 6.5 to 1 but it will show 6 to 1 on the screen. Now just press any key (except [BREAK]) and the horses will go to the starting gate. Horse number 1 is at the top and number 7 at the bottom. If it is the first race of the day, track music will play. And then "they're off." The

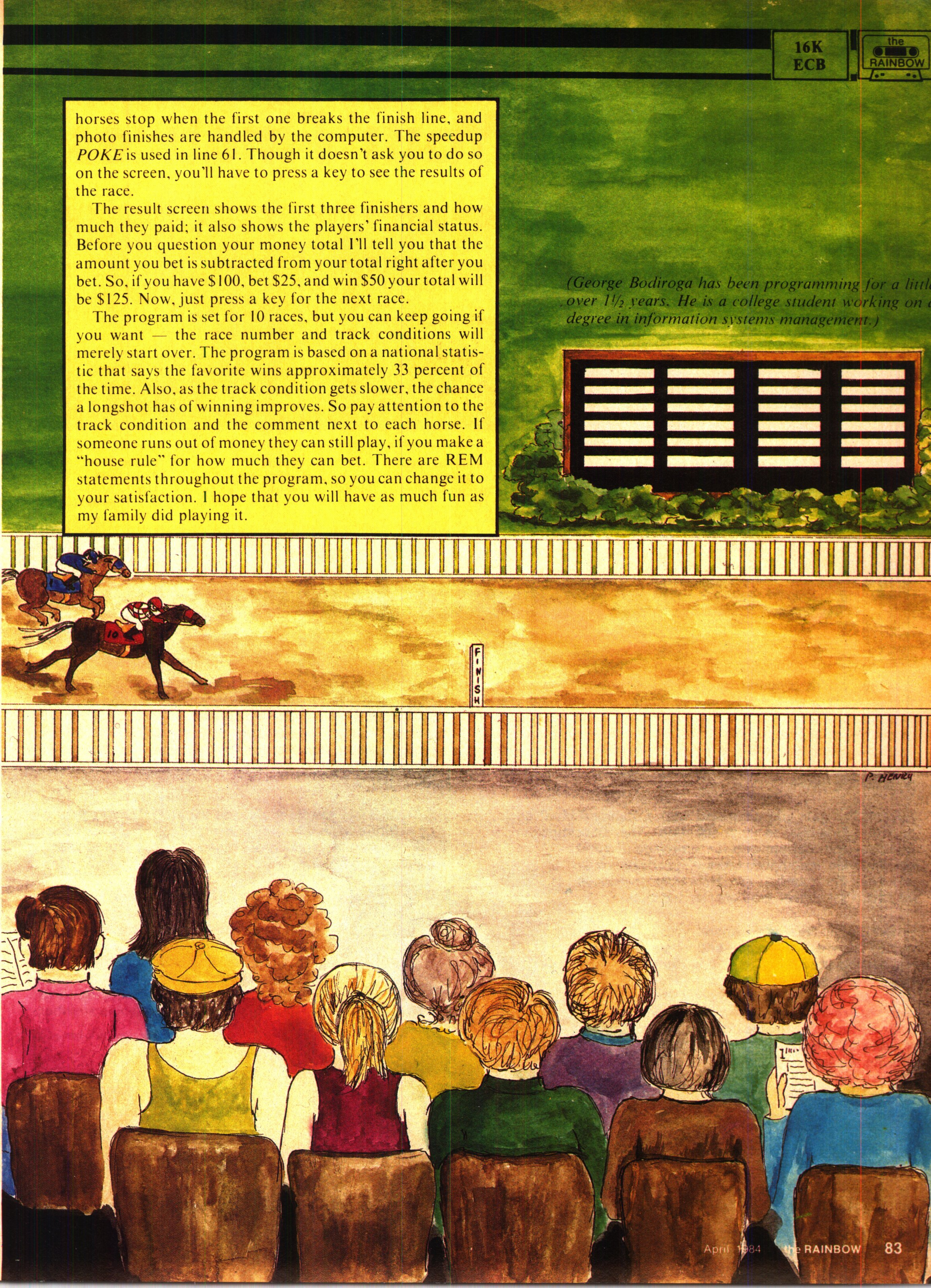


horses stop when the first one breaks the finish line, and photo finishes are handled by the computer. The speedup *POKE* is used in line 61. Though it doesn't ask you to do so on the screen, you'll have to press a key to see the results of the race.

The result screen shows the first three finishers and how much they paid; it also shows the players' financial status. Before you question your money total I'll tell you that the amount you bet is subtracted from your total right after you bet. So, if you have $100, bet $25, and win $50 your total will be $125. Now, just press a key for the next race.

The program is set for 10 races, but you can keep going if you want — the race number and track conditions will merely start over. The program is based on a national statistic that says the favorite wins approximately 33 percent of the time. Also, as the track condition gets slower, the chance a longshot has of winning improves. So pay attention to the track condition and the comment next to each horse. If someone runs out of money they can still play, if you make a "house rule" for how much they can bet. There are REM statements throughout the program, so you can change it to your satisfaction. I hope that you will have as much fun as my family did playing it.

(George Bodiroga has been programming for a littl over 1½ years. He is a college student working on degree in information systems management.)



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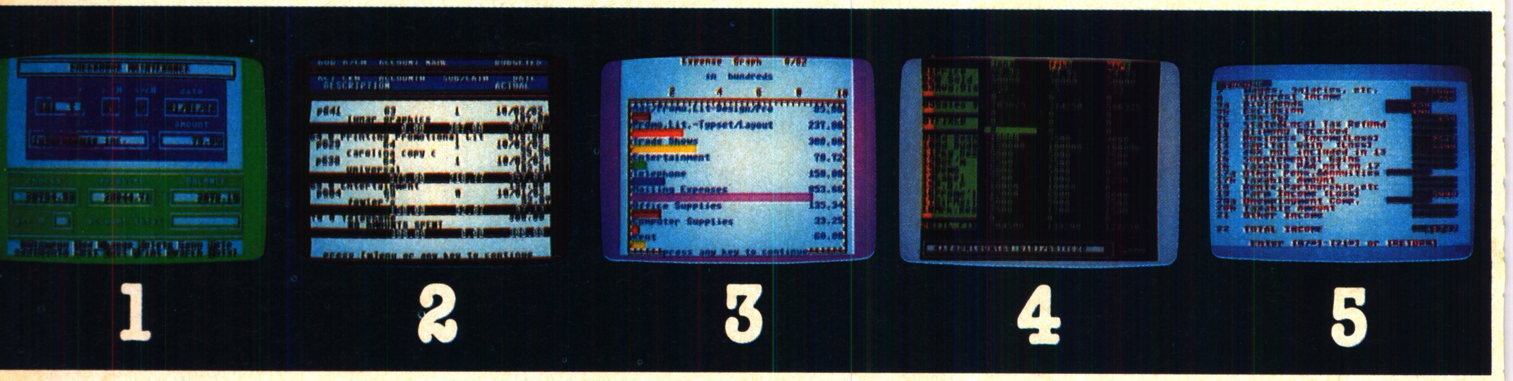

actual screen display *indicates function being shown

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22	225
42	59
60	79
81	133
101	41
124	15
137	149
END	149

The listing:

```
1 'A DAY AT THE RACES
2 'BY GEORGE BODIROGA
3 '(C) JAN. 1984
4 CLEAR100:PCLEAR 4:W=1:FF$="##.
##":QQ$="####.##"
6 DIM H1(0,5),H2(0,5),H3(0,5),CO
$(8),DA$(21),OS(7)
8 PMODE 4,1:SCREEN 0,0:PCLS
9 DRAW "BM19,19;NG2;R3;D4;ND5;NG
5;R7;ND5;NF5;E2;R1;F2"
10 GET(16,19)-(33,30),H1,G
11 GET(100,100)-(118,111),H2,G
12 FOR I=1TO21:READ DA$(I):NEXT
13 DRAW"BM19,19;NG2;R3;D4;ND5;NF
5;R7;ND5;NG5;E2;R1;F2"
14 GET(16,19)-(33,30),H3,G
15 GOTO 57
16 FOR I=1TO3
17 PO(I,1)=2*OD(W(I))+2:IF PO(I,
1)<4THEN PO(I,1)=4
18 PO(I,2)=PO(I,1)*.52:IF PO(I,2
)<2.2THEN PO(I,2)=2.2
19 PO(I,3)=PO(I,1)*.31:IF PO(I,3
)<2.2THEN PO(I,3)=2.2
20 NEXT
21 '** LINES 22-31 FIGURE WHICH
PLAYERS WIN
22 FOR I=1TO P
23 IF PH(I)<>W(1) AND PH(I)<>W(2
) AND PH(I)<>W(3) THEN PH(I)=0
24 IF PH(I)=W(1) AND PT$(I)="W"
THEN PH(I)=PO(1,1)*PB(I)/2
25 IF PH(I)=W(1) AND PT$(I)="P"
THEN PH(I)=PO(1,2)*PB(I)/2
26 IF PH(I)=W(1) AND PT$(I)="S"
THEN PH(I)=PO(1,3)*PB(I)/2
27 IF PH(I)=W(2) AND PT$(I)="P"
THEN PH(I)=PO(2,2)*PB(I)/2
28 IF PH(I)=W(2) AND PT$(I)="S"
THEN PH(I)=PO(2,3)*PB(I)/2
29 IF PH(I)=W(3) AND PT$(I)="S"
THEN PH(I)=PO(3,3)*PB(I)/2
30 IF PT$(I)="W" AND PH(I)=W(2)T
HEN PH(I)=0ELSE IF PT$(I)="W" AN
D PH(I)=W(3)THEN PH(I)=0ELSE IF
PT$(I)="P" AND PH(I)=W(3)THEN PH
(I)=0
31 NEXT I
32 RETURN
34 DIM PN$(P),PO(3,3),PT$(P),PH(
P),PB(P),PM(P),OD(7),FA(7),W(3),
LO(7):RETURN
35 CLS:PRINT" RACE NO.";W;TAB(17
)"TRACK: ";CO$(8):PRINT
36 FOR I=1TO P
37 FOR J=1TO7
38 IF J=PH(I)THEN OD(J)=OD(J)-1.
4ELSE OD(J)=OD(J)+.5
39 IF OD(J)<1THEN OD(J)=1
40 NEXT J
41 NEXT I
42 PRINT"   HORSE      FINAL ODDS
"
43 FOR I=1TO7:PRINT "     ";I;TAB
(16);:PRINTUSING "##";INT(OD(I))
;:PRINT"-1":NEXT
44 RETURN
45 '** LINES 46-56 GIVE TRACK CO
NDITION ADVANTAGES
46 FOR I=1TO7
47 IFW=5ORW=6THEN FA(I)=FA(I)-.2
48 IFW=7ORW=8THEN FA(I)=FA(I)-.3
49 IFW>8THEN FA(I)=FA(I)-.4
50 IFCO$(I)=DA$(2)ORCO$(I)=DA$(4
)ORCO$(I)=DA$(16)THEN FA(I)=FA(I
)+.2
51 IFCO$(I)=DA$(21)THEN FA(I)=FA
(I)+.35
52 IFW>4ANDCO$(I)=DA$(12)THEN FA
(I)=FA(I)+.2
53 IFW>4ANDCO$(I)=DA$(15)THEN FA
(I)=FA(I)+.2
54 IFW>4ANDCO$(I)=DA$(18)THEN FA
(I)=FA(I)+.2
55 IFW>4ANDCO$(I)=DA$(20)THEN FA
(I)=FA(I)+.2
56 RETURN
57 CLS:INPUT"ENTER NUMBER OF PLA
YERS";P:CLS:GOSUB 34
58 FOR I=1TO P:PRINT"ENTER NAME
OF PLAYER#";I;:LINEINPUT PN$(I):
NEXT
60 FOR I=1TO P:PM(I)=75:NEXT I
61 POKE 65495.0
62 '** LINES 63-67 SET TRACK CON
DITION
63 IF W<3THEN CO$(8)="FAST"
64 IF W>2THEN CO$(8)="GOOD"
65 IF W>4THEN CO$(8)="SLOW"
66 IF W>6THEN CO$(8)="MUDDY"
67 IF W>8 THEN CO$(8)="SLOPPY"
68 '** LINE 69 SET STARTING ODDS
69 FOR I=1TO 7:OD(I)=RND(18):NEX
T
```

```
70 GOSUB 141
71 CLS:PRINT"RACE NO.";W;TAB(17)
"TRACK: ";CO$(8)
72 PRINT:PRINT"HORSE  ODDS
COMMENTS"
73 FOR I=1TO7:PRINTTAB(1);I;"
";:PRINTUSING "##";OD(I);:PRINT"
-1";TAB(13) CO$(I):NEXT
74 PRINT@384,"
       ":FOR I=1TO P:PRINT@384,P
N$(I);:INPUT" ENTER HORSE # ";PH
(I):INPUT"ENTER AMOUNT OF BET ";
PB(I):PM(I)=PM(I)-PB(I):INPUT"WI
N PLACE OR SHOW ";PT$(I)
75 PRINT@384,"
  ":PRINT@416,"
   ":PRINT@448,"
    ":NEXT
76 GOSUB 35
77 FOR I=1TO7
78 IF OD(I)>14THEN FA(I)=5.531
79 IF OD(I)<15THEN FA(I)=5.605
80 IF OD(I)<12THEN FA(I)=5.744
81 IF OD(I)<9THEN FA(I)=5.895
82 IF OD(I)<7THEN FA(I)=6.055
83 IF OD(I)<5THEN FA(I)=6.223
84 IF OD(I)<3THEN FA(I)=6.405
86 NEXT I
87 GOSUB 46
88 PRINT:PRINT"   PRESS ANY KEY
TO RACE"
89 A$=INKEY$:IFA$<>""THEN 91ELSE
 89
90 '** LINES 91-97 DRAW HORSES A
T STARTING GATE
91 X=235:XX=252:Y=4:YY=15
92 PCLS:PMODE 4,1:SCREEN 1,1
93 DRAW"BM255,1;NL25;D16;NL25;D1
6;NL25;D16;NL25;D16;NL25;D16;NL2
5;D16;NL25;D16;NL25":LINE(230,1)
-(230,112),PSET,B
94 LINE(10,1)-(10,150),PSET,B
95 FOR I=1TO7
96 PUT(X,Y)-(XX,YY),H1,PSET
97 Y=Y+16:YY=YY+16:NEXT
98 FOR I=1TO7:LO(I)=235:NEXT I
99 IFW=1THEN PLAY"O2;T5;L4;FB-;O
3;DF;L8;FF;L4;FD;L8;DD;L4;D;O2;B
-;O3;D;O2;B-;L1;F;L4;FB-;O3;DF;L
8;FF;L4;FD;L8;DD;L4;D;O2;FFF;L1;
B-"
100 FORI=1TO1600:NEXT:LINE(230,1
)-(230,112),PRESET,B:PLAY"L16;T1
2;V23;O5;10;10;11;11;10;11;"
101 TIMER=0
102 '** LINES 103-109 MOVE HORSE
S
103 N=RND(7)
104 PUT(LO(N),16*N-12)-(LO(N)+17
,16*N-1),H3,PSET
105 PUT(LO(N),16*N-12)-(LO(N)+17
,16*N-1),H2,PSET
106 LO(N)=LO(N)-FA(N):IF LO(N)<=
11THEN LO(N)=10
107 PUT(LO(N),16*N-12)-(LO(N)+17
,16*N-1),H1,PSET:TI=TIMER
108 IF LO(N)=10 THEN 110
109 GOTO 103
110 A$=INKEY$:IF A$<>""THEN 112
ELSE 110
111 '** LINES 112-119 SORT FOR 1
ST,2ND,3RD
112 FOR I=1TO3
113 SM=1000
114 FOR J=1TO7
115 IF LO(J)<SM THEN SM=LO(J) EL
SE 117
116 W(I)=J
117 NEXT J
118 LO(W(I))=1000
119 NEXT I
120 GOSUB 16
121 '** LINES 122-132 SHOW WINNE
RS & PLAYERS STANDINGS
122 CLS:PRINT" RACE";W;TAB(11)"
WIN";TAB(18)"PLACE";TAB(25)"SHOW
"
123 PRINT"HORSE #";W(1);:PRINTTA
B(12);"";:PRINTUSING FF$;PO(1,1)
;:PRINTTAB(18);"";:PRINTUSING FF
$;PO(1,2);:PRINTTAB(25);"";:PRIN
TUSING FF$;PO(1,3)
124 PRINT"HORSE #";W(2);TAB(18);
:PRINTUSING FF$;PO(2,2);:PRINTTA
B(25);:PRINTUSING FF$;PO(2,3)
125 PRINT"HORSE #";W(3);TAB(25)"
";:PRINTUSING FF$;PO(3,3)
126 PRINTTAB(8)"OFFICIAL TIME ";
:PRINT USING"##.##";TI/60
127 IF P<9THEN 129ELSE PRINT:PRI
NT@160,"PRESS ANY KEY FOR PLAYER
 RESULTS";
128 A$=INKEY$:IF A$<>""THEN 129
ELSE 128
129 PRINT:PRINT"PLAYER    AMT.WO
N   TOTAL"
130 FOR I=1TO P
131 PM(I)=PM(I)+PH(I)
132 PRINT PN$(I);TAB(10);:PRINTU
SING QQ$;PH(I);:PRINTTAB(20)"";:
PRINTUSING QQ$;PM(I):NEXT
133 POKE 65494,0
134 PRINT"PRESS ANY KEY TO RACE
AGAIN";
135 A$=INKEY$:IF A$<>""THEN 136
ELSE 135
```

```
136 W=W+1:IF W>10THEN W=1
137 GOTO 61
138 DATA WON ROUTER,WON 2 OF LAS
T 3,SPEED TO LEAD,SURE TO SHOW,R
ACED WITH BETTER,JOCK SWITCH,CAN
 STEAL IT,WHIPPED FAVORITE,CLASS
 DIP CAN WIN,CHANGE OF BOY,DROP
IN CLASS,WON IN MUD
139 DATA BROKE LATE,LED TO STRET
CH,2ND IN SLOP,BEST CHANCE PLAY,
CLOSED FAST,BETTER IF WET,FADED
QUICKLY,SLOP CHOICE,NOT IMPOSSIB
LE
140 '** LINES 141- MAKE SURE ODD
S ARE OF A GOOD RANGE AND GIVE H
ORSES A COMMENT
141 FOR I=1TO 7:OS(I)=OD(I):NEXT
142 FOR I=1TO7
143 SM=100
144 FOR J=1TO7
145 IF OS(J)<SM THEN SM=OS(J)ELS
E 147
146 V=J
147 NEXT J
148 IFI=1THEN IF OS(V)>2THENOD(V
)=2
149 IFI=2THEN IF OS(V)<3THENOD(V
)=3
150 IFI=7THEN IF OS(V)<15THENOD(
V)=15
151 IFI=3THEN IF OS(V)>9THENOD(V
)=7
152 CO$(V)=DA$(RND(3)+R)
153 OS(V)=100
154 R=R+3
155 NEXT I
156 R=0
157 RESTORE
158 RETURN
```

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- Can be turned on and off while your basic program is running.
- Can write to cassette and printer at same time.
- Absolutely no change to printer formats.
- All control codes normally sent to printer will be captured to the cassette with printed data.
- Supplied utility will print from tape, convert the tape to a disk file, print the converted disk file, and print multiple copies of either the tape or disk (multiple copy function cannot process files greater than 14,790 characters)

** Great for generating 2 seperate reports from the same file on a single pass.

** Use as a "printing press" for generating multiple copies of meeting notices, ads, circulars, you name it!

** Share a printer!!! Take your "Saved Printout" on tape to a friend that has a printer!

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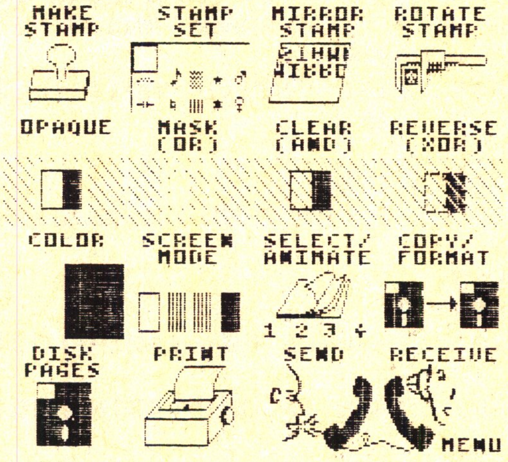

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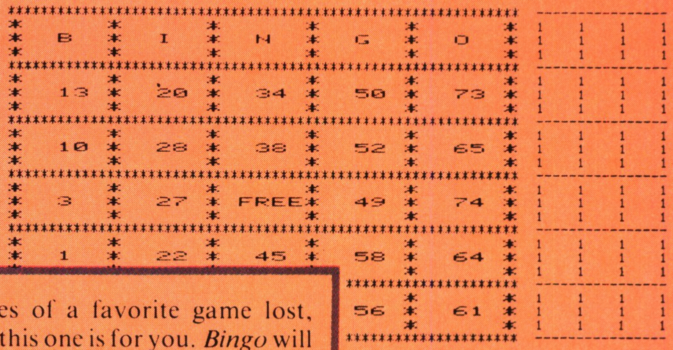
Instant Fun!

By Joe Hadley



```
*****************************************************************
*          *          *          *          *          *  1   1   1   1
*    B     *    I     *    N     *    G     *    O     *  1   1   1   1
*          *          *          *          *          *  1   1   1   1
*****************************************************************
*          *          *          *          *          *  1   1   1   1
*   13     *   20     *   34     *   50     *   73     *  1   1   1   1
*          *          *          *          *          *  1   1   1   1
*****************************************************************
*          *          *          *          *          *  1   1   1   1
*   10     *   28     *   38     *   52     *   65     *  1   1   1   1
*          *          *          *          *          *  1   1   1   1
*****************************************************************
*          *          *          *          *          *  1   1   1   1
*    3     *   27     *  FREE    *   49     *   74     *  1   1   1   1
*          *          *          *          *          *  1   1   1   1
*****************************************************************
*          *          *          *          *          *  1   1   1   1
*    1     *   22     *   45     *   58     *   64     *  1   1   1   1
                                            *          *  1   1   1   1
                                      ***********************
                                            *          *  1   1   1   1
                                       56   *   61     *  1   1   1   1
                                            *          *  1   1   1   1
                                      ***********************
```

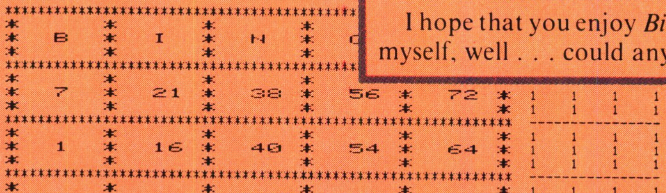
If you have ever had pieces of a favorite game lost, spindled or mutilated, then this one is for you. *Bingo* will do five major things: 1) It will print as many different bingo cards as one could use, two per page. 2) Next to the cards are markers that can be colored and cut out. (My kids like that part.) 3) It will call the numbers on the screen. A tone and screen color change accompanies each call. 4) It will display all the calls in the order called. 5) It will check the winner's numbers to avoid differences of opinion.

Bingo was written for a 16K ECB CoCo and a Radio Shack DMP-100 printer. Any printer that has line feed and double width commands will work. The line feed command for the DMP-100 is 13 and the double width command is 31. (30 is normal print.) Only seven lines would need modification.

Here are a couple other helpful notes. If a key is pressed while calls are being made, calling will stop and then the winning numbers can be checked. To increase or decrease the time that calls are displayed, change 1500 in line 920 to a higher or lower number.

As with any program, *Bingo* could have been written any of a thousand different ways. I chose two ways of determining numbers. The numbers on the cards are subscripted variables that are randomly choosen and then set to a specific number to avoid repetition. The alphanumerics displayed on the screen are pulled from a set of *DATA* statements. These are then assigned a subscripted number which is stored and retrieved later to check the winner's numbers.

I hope that you enjoy *Bingo* as much as my kids do. As for myself, well . . . could anybody use 200 bingo cards?



```
*************************************
*          *          *          *
*    B     *    I     *    N     *
*          *          *          *
*************************************
*          *          *          *          *          *  1   1   1   1
*    7     *   21     *   38     *   56     *   72     *  1   1   1   1
*          *          *          *          *          *  1   1   1   1
*****************************************************************
*          *          *          *          *          *  1   1   1   1
*    1     *   16     *   40     *   54     *   64     *  1   1   1   1
*          *          *          *          *          *  1   1   1   1
*****************************************************************
*          *          *          *          *          *  1   1   1   1
*    4     *   25     *  FREE    *   58     *   67     *  1   1   1   1
*          *          *          *          *          *  1   1   1   1
*****************************************************************
*          *          *          *          *          *  1   1   1   1
*    6     *   24     *   43     *   55     *   73     *  1   1   1   1
*          *          *          *          *          *  1   1   1   1
*****************************************************************
*          *          *          *          *          *  1   1   1   1
*   10     *   29     *   44     *   46     *   63     *  1   1   1   1
*          *          *          *          *          *  1   1   1   1
*****************************************************************
```

(Staff Sergeant Joe Hadley works at Hays Army Hospital at Ft. Ord, Calif., as a bio-medical electronic technician. He holds a bachelor's degree in music education and an associate of science degree in medical equipment maintenance. As a single parent of three daughters, he keeps his sanity by programming the CoCo as a hobby.)

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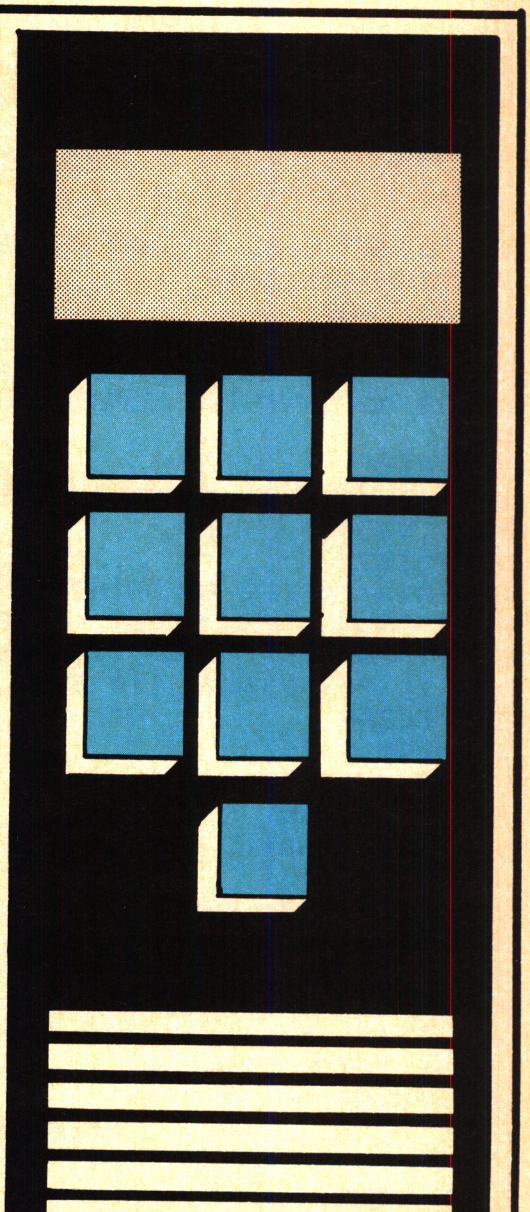

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650	72
800	95
1060	59
END	26

The listing:

```
10 'BINGO GAME BY JOE HADLEY
20 'JANUARY 1984
30 GOTO600
40 CLS:PRINT"POSTION PAPER IN PR
INTER        THEN PRESS <P>"'STA
RT OF DETERMINING NUMBERS ON CAR
DS
50 PRINT
60 PRINT"PRESS <BREAK> TO STOP P
RINTING"
70 PRINT
80 PRINT"AFTER PRESSING <BREAK>
TYPE 'RUN' THEN PRESS <ENTER>."
90 P$=INKEY$:IF P$=""THEN 90
100 IF P$="P"THEN 110 ELSE 40
110 CLEAR
120 DIM B(15)
130 DIM I(30)
140 DIM N(45)
150 DIM G(60)
160 DIM O(75)
170 PRINT#-2,CHR$(13)CHR$(13)CHR
$(13)
180 PRINT#-2,CHR$(30)"**********
********************************
********************  ----------
------"'TOP LINE
190 PRINT#-2,CHR$(31)"*     *
  *     *     *     *";CHR$(30)"
  1    1    1    1"'SKIP 1 AFTER
 TOP LINE
200 PRINT#-2,CHR$(31)"*  B  *  I
  *  N  *  G  *  O  *";CHR$(30)"
  1    1    1    1"
210 PRINT#-2,CHR$(31)"*     *
  *     *     *     *";CHR$(30)"
  1    1    1    1"'SKIP 1 AFTER
 BINGO
220 PRINT#-2,CHR$(30)"**********
********************************
********************  ----------
------"'BOTTOM LINE UNDER BINGO
230 'DETERMINE NUMBERS ON CARDS
240 B(1)=1:B(2)=2:B(3)=3:B(4)=4:
B(5)=5:B(6)=6:B(7)=7:B(8)=8:B(9)
=9:B(10)=10:B(11)=11:B(12)=12:B(
13)=13:B(14)=14:B(15)=15:I(1)=16
:I(2)=17:I(3)=18:I(4)=19:I(5)=20
:I(6)=21:I(7)=22:I(8)=23:I(9)=24
:I(10)=25:I(11)=26:I(12)=27:I(13
)=28:I(14)=29:I(15)=30
250 N(1)=31:N(2)=32:N(3)=33:N(4)
=34:N(5)=35:N(6)=36:N(7)=37:N(8)
=38:N(9)=39:N(10)=40:N(11)=41:N(
12)=42:N(13)=43:N(14)=44:N(15)=4
5:G(1)=46:G(2)=47:G(3)=48:G(4)=4
9:G(5)=50:G(6)=51:G(7)=52:G(8)=5
3:G(9)=54:G(10)=55:G(11)=56:G(12
)=57:G(13)=58:G(14)=59
260 G(15)=60:O(1)=61:O(2)=62:O(3
)=63:O(4)=64:O(5)=65:O(6)=66:O(7
)=67:O(8)=68:O(9)=69:O(10)=70:O(
11)=71:O(12)=72:O(13)=73:O(14)=7
4:O(15)=75
270 FOR L=1 TO 5
280 PRINT#-2,CHR$(31)"*     *
  *     *     *     *";CHR$(30)"
  1    1    1    1"
290 BB=RND(15)
300 BB=B(BB)
310 IF B(BB)=0 THEN 290
320 B(BB)=0
330 II=RND(15)
340 II=I(II)
350 IF I(II)=1 THEN 330
360 I(II)=1
370 NN=RND(15)
380 NN=N(NN)
390 IF N(NN)=1THEN 370
400 N(NN)=1
410 GG=RND(15)
420 GG=G(GG)
430 IF G(GG)=1 THEN 410
440 G(GG)=1
450 OO=RND(15)
460 OO=O(OO)
470 IF O(OO)=1 THEN 450
480 O(OO)=1
490 IF BB=>10 AND L<>3 THEN 540
500 'PRINT NUMBERS ON CARDS
510 IF BB<10 AND L<>3 THEN PRINT
#-2,CHR$(31)"* ";BB;" * ";II"* "
;NN"* ";GG"* ";OO"*";CHR$(30)"
1    1    1    1":GOTO550
520 IF BB>10 AND L=3 THEN PRINT#
-2,CHR$(31)"* ";BB"* ";II"* FREE
* ";GG"* ";OO"*";CHR$(30)"   1
 1    1    1":GOTO550
530 IF BB<10 AND L=3 THEN PRINT#
-2,CHR$(31)"* ";BB;" * ";II"* FR
EE* ";GG"* ";OO"*";CHR$(30)"   1
   1    1    1":GOTO550
540 PRINT#-2,CHR$(31)"* ";BB"* "
;II"* ";NN"* ";GG"* ";OO"*";CHR$
```

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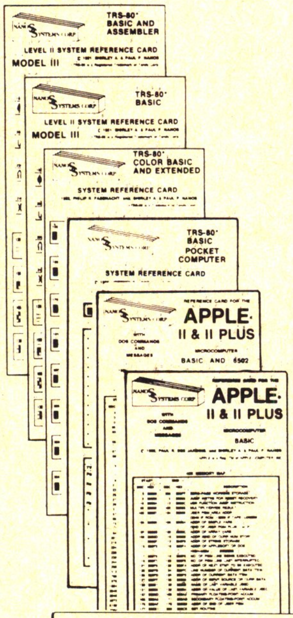
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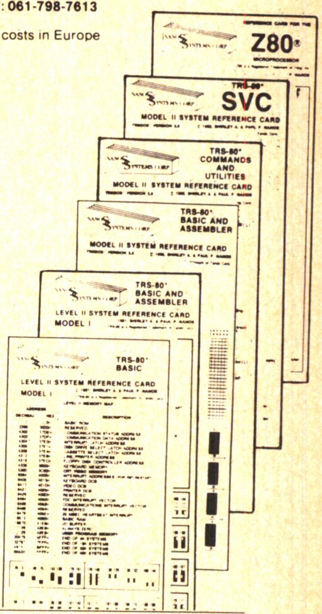
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```
(30)"  1     1     1     1"
550 PRINT#-2,CHR$(31)"*     *
  *     *     *     *";CHR$(30)"
  1     1     1     1"'SKIP 1 AFTER
 NUMBERS
560 PRINT#-2,CHR$(30)"***********
********************************
********************  ----------
------"'LINE UNDER NUMBERS
570 NEXT L
580 GOTO110
600 CLS:PRINT"         B   I   N
 G   O": 'TITLE AND BEGINNING OF
 PROGRAM
610 PLAY "L8;O3;G;O4;C;C;C;O3;G;
A;A;L4;O3;G;L8;O4;C;C;D;D;L4;E;E
;E;E;L8;F;F;L4;F;D;D;L8;E;E;L4;E
;C;C;L8;D;D;D;C;O3;B;G;A;B;L4;O4
;C;L2;C
620 PRINT@448,"PRESS ANY KEY TO
CONTINUE"
630 Z$=INKEY$:IF Z$=""THEN 630
640 CLS:LINEINPUT"DO YOU NEED BI
NGO CARDS ";Y$
650 IFLEFT$(Y$,1)="Y"THEN 40 ELS
E IF LEFT$(Y$,1)="N"THEN 670
660 GOTO640
670 'START OF NUMBER CALLING
680 CLS: PRINT"PRESS ANY KEY TO
CONTINUE"
690 X$=INKEY$:IFX$=""THEN 690
700 DIM H$(75):DIM N$(75):DIM E(
75)
710 DATA B01,B02,B03,B04,B05,B06
,B07,B08,B09,B10,B11,B12,B13,B14
,B15
720 DATA I16,I17,I18,I19,I20,I21
,I22,I23,I24,I25,I26,I27,I28,I29
,I30
730 DATA N31,N32,N33,N34,N35,N36
,N37,N38,N39,N40,N41,N42,N43,N44
,N45
740 DATA G46,G47,G48,G49,G50,G51
,G52,G53,G54,G55,G56,G57,G58,G59
,G60
750 DATA O61,O62,O63,O64,O65,O66
,O67,O68,O69,O70,O71,O72,O73,O74
,O75
760 C=0:CLS:PRINT"GET READY TO B
IN-GO":FORT=1TO800:NEXTT
770 FOR X=1 TO 75
780 E(X)=E
790 NEXT X
800 FOR B=1 TO 75
810 X=RND(75):IFX<1THEN810
820 IF E(X)=76 THEN 810
830 E(X)=76
840 C=C+1
850 FOR N=1 TO X
860 READN$
870 NEXTN
880 H$(C)=N$
890 V=RND(8)
900 CLS(V):PRINT@239,N$;
910 SOUND225,1
920 FORK=1TO1500:NEXTK'TIMER FOR
 NUMBERS ON SCREEN
930 RESTORE
940 L$=INKEY$:IFL$=""THEN NEXT B
 ELSE 950
950 CLS:PRINT@143,"A";
960 PRINT@202,"W I N N E R";
970 FOR X=1TO255 STEP5:SOUND X,1
:NEXT
980 CLS:PRINT"DO YOU WANT TO"
990 INPUT" 1) PLAY ANOTHER GAME
           2) SEE ALL THE CALLS
           3) CHECK THE WINNERS
NUMBERS    4) END";Q
1000 ON Q GOTO 760,1010,1050,127
0
1010 CLS:FORB=1TOC:PRINTH$(B)" "
 ;:NEXTB
1020 PRINT@448,"PRESS ANY KEY TO
 CONTINUE"
1030 W$=INKEY$:IFW$=""THEN1030
1040 GOTO980
1050 CLS:LINEINPUT"TYPE IN THE W
INNER'S NUMBERS     (HIT <ENTER>
 AFTER EACH ENTRY)     1)";A$
1060 LINEINPUT"2)";B$
1070 LINEINPUT"3)";C$
1080 LINEINPUT"4)";D$
1090 LINEINPUT"5)";E$
1100 FOR B=1TOC
1110 IF H$(B)=A$ THEN A$=A$+" CA
LLED"
1120 IF H$(B)=B$ THEN B$=B$+" CA
LLED"
1130 IF H$(B)=C$ THEN C$=C$+" CA
LLED"
1140 IF H$(B)=D$ THEN D$=D$+" CA
LLED"
1150 IF H$(B)=E$ THEN E$=E$+" CA
LLED"
1160 NEXTB
1170 CLS:PRINT"ALL NUMBERS CHECK
ED"
1180 PRINT"#1  ";A$
1190 PRINT"#2  ";B$
1200 PRINT"#3  ";C$
1210 PRINT"#4  ";D$
1220 PRINT"#5  ";E$
1230 PRINT@448,"PRESS ANY KEY TO
 CONTINUE"
1240 S$=INKEY$:IFS$=""THEN1240
1250 GOTO 980
1260 END
1270 END
```

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By Steve Kincade

Blackjak starts with a color test. This program uses the false colors of *PMODE4* and to be sure that the cards are red and black, and not blue and black, this was necessary. Next, there is the title page and credits followed by a graphic scene in which the computer will give you your chips. Now you are ready to play *Blackjak*. You can play with either the right joystick or, for one player, you can use the arrow keys. The format is quite simple — move the joystick down to bet and then up to play. If more than one are playing, then any player can skip his turn by playing with no bet made.

You move the joystick left or right to "hit" or to "stay" with the cards up on the table. Once you stay, the computer then plays its cards and you will win, lose or tie.

If you win on a 21, or blackjack, or a five-card hand, the payoff is triple. If you win on less than 21, then the payoff is double. You get money back on a tie (after all, this is just a social game) and you lose your money on a bust or if you lose the hand.

If you would prefer to lose on a tie, change Z=3 in line 3070 to Z=4. There is one way that you can lose on a 21 hand. This will happen if the computer can get a five-card hand.

If you press "S" before you place a bet, you can see the score. You will also see the score when someone runs out of money. The computer will lend that player more money, but will also keep running tabs. This is so that no one is left out and at the same time keeps things even.

Oh yes, one more thing; keep close watch on the dealer — he has shifty eyes.

Variable Directory

A = Color (blue/red)
B = Bet for player up
C = Color (red/blue)
D = Value of card
E = Bet placed — flag
F = Money bet — flag
G = Total of players' hand
H = Total of house's hand
I = Random function
J = Joystick (0)
K = Joystick (1)
L = Length of string
M = Letter in string
N = Color of suit
NG = Flag for second game
P = Number of players
R = Number to be printed
T = The card in play
U = Number to be printed
V = Number to be printed
C(2,6) = Suit card
D(1,10) = Down card
E(2,7) = Suit card
F(2,8) = Suit card
G(2,8) = Suit card
H(5,5) = Chip
T(10) = Value of cards
W(1-4) = Money per player
W(5-8) = Money owed to bank
A$ = *INKEY$*
A5$ = Joystick or keyboard
O$(26) = Letters
R$ = String to be printed
W = Winnings for player up
WW = Counter
X = Counter
XX = Counter
Y = Counter
Z = Flag for end of play
A(2,6) = Flip card
B(2,6) = Flip card

190	188	2760	138
360	53	2910	172
430	50	3070	62
610	2	3290	31
800	2	3430	178
1270	214	3600	250
1460	184	3760	202
1640	48	3840	77
1800	215	3920	38
1970	210	4080	101
2170	22	4190	219
2350	202	4380	79
2510	68	END	158

(Steve Kincade is currently studying computer science in business at DeVry Institute of Technology. He is a member of the Toronto Colour Computer Club and has, with his wife Sharon, run a software company — Kincade (Computer) Software Ltd. — for the past year.)

The listing:

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90 '***************************
91 '*                         *
100 REM   BLACKJAK (C) 1983 BY
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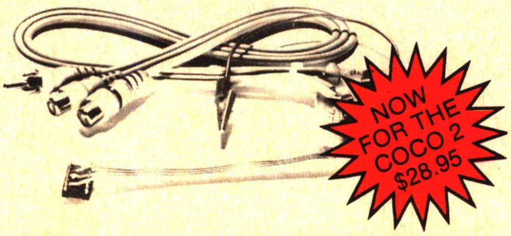

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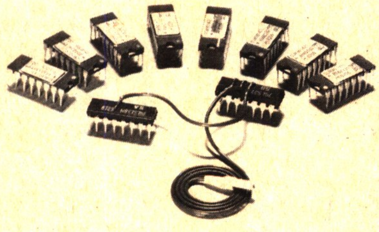

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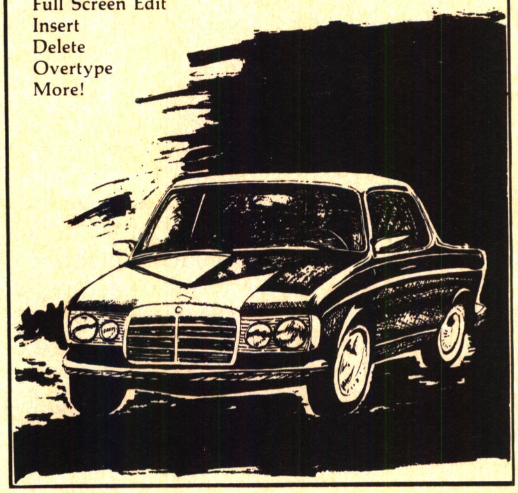

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```
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102 '*                          *
103 '****************************
110 PCLEAR4
120 REM INITAL SET-UP
130 CLS0:PRINT@192,"      HOW MAN
Y PLAYERS (1/4)      ";
140 A$=INKEY$:IFA$=""THEN140ELSE
IFA$="1"THEN P=1ELSEIFA$="2"THEN
 P=2ELSEIFA$="3"THEN P=3ELSEIFA$
="4"THEN P=4ELSEP=1
150 :FORX=1TO P:W(X)=4:W(X+4)=-4
:NEXT
160 IFVAL(A$)>1THENPRINT"all PLA
YERS WILL USE THE right  JOYSTIC
K WHEN PLAYING";:PRINT:PRINT:FOR
X=1TO1000:NEXT:A5$="":GOTO180
170 PRINT:PRINT"YOU MAY USE EITH
ER THE right     JOYSTICK OR THE
ARROW KEYS       TO PLAY.  PLEASE
 SAY WHICH YOU  WILL USE (jOYSTI
CK/kEYBOARD)":INPUTA5$
180 I=RND(-TIMER)
190 CLS0:PRINT@64," DO YOU WANT
INSTRUCTIONS (Y/N) ":INPUTA$:IFA
$="Y"THENGOSUB3720
200 CLS0:PMODE4,1:PCLS:SCREEN1,1
:PMODE3
210 IF NG=1THEN NG=0:GOTO230
220 DIMO$(26):DIMA(2,6),B(2,6),C
(2,6),E(2,7),F(2,8),G(2,8),D(1,1
0),T(10),H(5,5),CC(10)
230 A=3:C=2
240 REM DRAW CARDS AND SUITS
250 COLORC:DRAW"S4BM20,10R14G16L
14E16":PAINT(22,12),C,C
260 COLOR0:LINE(64,10)-(84,40),P
SET,BF
270 DRAW"BM74,25C1G8D2F2R4E2ND4F
2R4E2U2H8C0":PAINT(74,27),1,1
280 LINE(96,10)-(116,40),PSET,BF
290 COLOR C:DRAW"BM106,27H2L4G2D
2F8E8U2H2L4G2C0":PAINT(106,32),C
,C
300 LINE(128,10)-(148,40),PSET,B
F
310 DRAW"BM138,26C1L2G2D2F2L2G2D
1F2R2E2ND4F2R2E2U1H2L2E2U2H2C0":
PAINT(138,28),1,1
320 LINE(158,10)-(178,40),PSET,B
F
330 COLOR C:DRAW"BM168,26F6G6H6E
6":PAINT(168,30),C,C
340 COLORC:DRAW"BM210,10R14F16L1
4H16":PAINT(214,12),C,C
350 PMODE4,1:SCREEN1,1:PMODE3
355 REM ALPHABET
360 DATA U4E4F4L8R8D4BR4,U8R6F2G
2NL6F2G2NL6BR6,U8R8L8D8R8BR4,U8R
7FD6GL7R7BR5,U8R8L8D4R6L6D4R8BR4
,U8R8L8D4R6L6D4BR12,U8R8D2U2L8D8
R8U4L4R4D4BR4,U8D4R8U4D8BR4,R4U8
NL4NR4D8R4BR4,U2D2R8NU8BR4,U8D4R
4E4G4F4BR4,NU8R6BR6,U8F4E4D8BR4,
U8F8NU8BR4
370 DATA U8R8D8L8R8BR4,U8R8D4L8D
4BR12,U8R8D8L8R6H2F4H2BR6,U8R8D4
L8R4F4BR4,R8U4L8U4R8BD8BR4,BR4U8
L4R8BD8BR4,NU8R8NU8BR4,BR4H4NU4F
4E4U4BD8BR4,NU8E4F4NU8BR4,E8G4H4
F8BR4,BR4U4NH4E4BD8BR4,E8L8BD8R8
BR4
380 COLORC
390 REM GET RIGHT COLOR ON CARDS
400 RESTORE:FORT=1TO26:READO$(T)
:NEXTT:DRAW"BM40,60S4":R$="IF CA
RDS ARE BLUE":GOSUB650:DRAW"BM30
,90":R$="PRESS C ELSE PRESS":GOS
UB650:DRAW"BM30,130S12":R$="ENTE
R":GOSUB650
```

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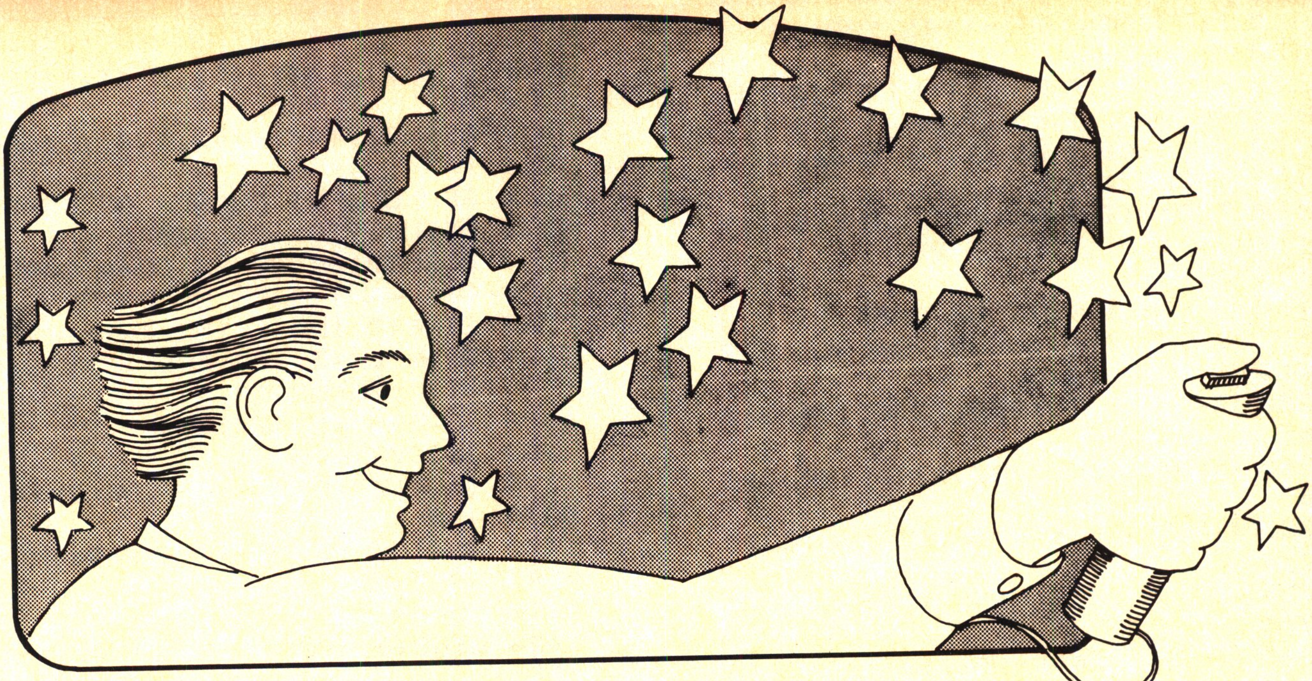
```
410 IFPEEK(339)=254THEN430ELSEIF
A=2THEN430ELSEA$=INKEY$:IFA$=""T
HEN410ELSEIFA$="C"THENA=2:C=3:GO
TO250
420 REM STING SONG
430 FORX=1TO200:NEXT:PLAY"T1V20O
4L16DL16EL16CO3L8AL16BL8GV15L16D
L16EL16CO2L8AL16BL8GV12L16DL16EL
16CO1L8AL16BL16AL16A-V10L8GO3L8G
V9O2L16DL16D+L16EO3L8CO2L16EO3L8
CO2L16EO3L4CV10O4L16CV12L16DV15L
16D+V20L16EL16CL16DL8EO3L16BO4L8
DO4L4CL16O3C":COLORC
440 COLORC
450 LINE(0,48)-(255,191),PRESET,
BF:DRAW"S6BM50,60":R$="BLACKJACK
":GOSUB650:CIRCLE(230,55),10,A:D
RAW"S3BM228,58":R$="C":GOSUB650
460 DRAW"BM40,80S4":R$="BY  STEV
E KINCADE":GOSUB650
470 REM SAVE CARDS AND SUITS
480 GET(4,10)-(40,30),A
490 GET(210,10)-(246,30),B
500 GET(66,10)-(86,40),C
510 GET(96,10)-(116,40),E
520 GET(128,10)-(148,40),F
530 GET(160,10)-(180,40),G
540 DRAW"BM20,110":R$="THE HOUSE
 LIMIT IS":GOSUB650
550 DRAW"BM20,130":R$="TEN THOUS
AND DOLLARS":GOSUB650
560 DRAW"BM20,155":R$="PRESS ENT
ER TO":GOSUB650:DRAW"BM20,174":R
$="START THE GAME":GOSUB650
570 IFPEEK(339)=254THEN580ELSEA$
=INKEY$:IFA$=""THEN570
580 FORX=100TO50STEP-2:SOUNDX,1:
NEXT
585 REM COVER CARDS
590 COLORC:LINE(64,10)-(84,40),P
SET,BF:GET(64,10)-(84,40),D
600 LINE(96,10)-(116,40),PSET,BF
:LINE(128,10)-(148,40),PSET,BF:L
INE(158,10)-(178,40),PSET,BF
610 REM TAKE CARDS AWAY
620 LINE(64,10)-(84,40),PRESET,B
F:LINE(96,10)-(116,40),PRESET,BF
:LINE(128,10)-(148,40),PRESET,BF
:LINE(158,10)-(178,40),PRESET,BF
630 GOTO660
640 REM SUBROUTINE TO PUT
    LETTERS ON GRAPHIC SCREEN
650 L=LEN(R$):FORTY=1TO L:M=ASC(
MID$(R$,TY,1))-64:IF M=-32THEN D
RAW"BR10":NEXTTY:RETURN ELSE DRA
WO$(M):PLAY"V10L110CO4L255A":NEX
TTY:RETURN
660 FORX=1TO500:NEXT
670 REM BLANK SCREEN WHILE
    SETTING UP NEXT SCREEN
680 CLS0:SCREEN0,0:GOSUB4170:PMO
DE4,1:PMODE3
690 FORX=50TO100:SOUNDX,1:NEXT
700 REM BLANK SCREEN WHILE
    SETTING UP NEXT SCREEN
710 CLS0:SCREEN0,0:PCLS:W=4
720 CIRCLE(60,40),25,4,1.1
730 CIRCLE(45,10),20,4,1,.07,.25
740 CIRCLE(80,14),20,4,1,.25,.50
750 PAINT(60,60),4,4
760 DRAW"BM48,36C1R6BR10R6
770 DRAW"BM58,40F4D3L8U3E4
780 LINE(56,56)-(66,52),PSET
790 DRAW"BM66,52H2F4
800 CIRCLE(42,74),14,3,1,.55,.85
810 DRAW"BM48,65C3R24
820 CIRCLE(78,74),14,3,1,.65,.8
830 DRAW"BM30,108R54U28F12R26U10
L18H20
840 DRAW"BM30,68G20F20
850 PAINT(80,80),3,3
860 DRAW"BM36,78C1G10F20
870 DRAW"BM122,90C4U6R2D6R2U6R2C
2NU4D10R8U14L8BR10BD4C4D6
880 PAINT(130,86),2,2
890 LINE(220,0)-(220,48),PSET:LI
NE(220,48)-(160,48),PSET:LINE-(1
60,68),PSET:LINE-(220,68),PSET:L
INE-(220,112),PSET:LINE-(160,112
),PSET:LINE-(160,132),PSET:LINE-
(220,132),PSET:LINE-(220,176),PS
ET
900 LINE(0,176)-(220,176),PSET:L
INE(220,48)-(256,48),PSET:LINE(2
20,68)-(256,68),PSET
910 PMODE4,1:SCREEN1,1:PMODE3
920 REM GO PLACE BET
930 GOSUB1690
940 REM FIND WHICH PLAYER
950 GOSUB3960
960 PMODE4:SCREEN1,1:PMODE3
970 REM START OF MAIN LOOP
980 GOSUB1710'PLACE BET
990 REM DEAL FIRST TWO CARDS
1000 FORT=1TO2:GOSUB1020:GOTO109
0
1010 REM MAKE EYES MOVE
1020 FORY=1TO2
1030 PSET(48,37,1):PSET(64,37,1)
1040 FORX=1TO200:NEXTX
1050 PSET(48,37,4):PSET(54,37,1)
:PSET(64,37,4):PSET(70,37,1)
1060 FORX=1TO200:NEXT
1070 PSET(54,37,4):PSET(70,37,4)
:NEXTY
1080 RETURN
1090 GOSUB1110:GOTO1190
1100 REM THE FLIP CARDS
```



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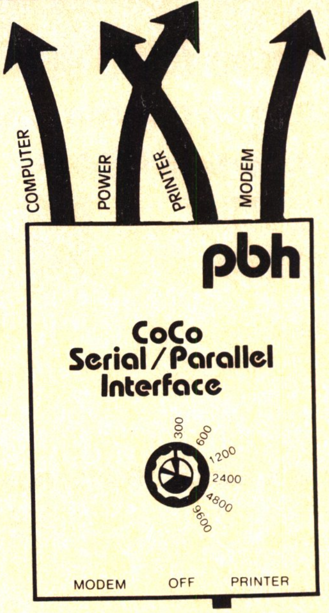

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```
1110 PUT(108,108)-(146,128),A
1120 GOSUB3440
1130 FORX=1TO70:NEXT:LINE(108,10
8)-(148,128),PRESET,BF
1140 PUT(100,120)-(136,136),B
1150 GOSUB3440
1160 FORX=1TO100:NEXT:LINE(96,12
0)-(136,136),PRESET,BF
1170 RETURN
1180 REM GET SUIT OF CARD
1190 GOSUB3050:GOSUB3700:GOSUB29
00:IFT=2THEN1210
1200 ON HH GOTO1220,1230,1240,12
50
1210 ON HH GOTO1280,1290,1300,13
10
1220 PUT(36,144)-(56,174),C:GOTO
1270
1230 PUT(36,144)-(56,174),E:GOTO
1270
1240 PUT(36,144)-(56,174),F:GOTO
1270
1250 PUT(36,144)-(56,174),G:GOTO
1270
1260 REM GO PUT NUMBER OF CARD
1270 GOSUB2930:GOSUB3440:NEXT
1280 PUT(71,144)-(91,174),C:GOTO
1330
1290 PUT(71,144)-(91,174),E:GOTO
1330
1300 PUT(71,144)-(91,174),F:GOTO
1330
1310 PUT(71,144)-(91,174),G:GOTO
1330
1320 REM GO PUT NUMBER OF CARD
1330 GOSUB2930:GOSUB3440
1340 GOSUB2100'HOUSE DOWN CARD
1350 REM WANT MORE CARDS???
1360 LINE(8,180)-(252,191),PRESE
T,BF:DRAW"BM10,190C4S6":R$="STAY
     HIT":GOSUB650
1370 IFA5$="K"THEN1400
1380 J=JOYSTK(0)
1390 IF J<30THEN J=80ELSE J=140:
GOTO1410
1400 A$=INKEY$:IFA$=CHR$(9)THENJ
=140ELSEJ=80
1410 COLOR A
1420 LINE(J,180)-(J+10,190),PSET
,BF
1430 LINE(J,180)-(J+10,190),PRES
ET,BF
1440 IF(A$=CHR$(9)OR A$=CHR$(8)O
R PEEK(339)=254)THEN A$="":GOTO1
450ELSEIFA5$="K"THEN1400ELSE1380
1450 IFJ=80THEN F=1:GOTO2100
1460 GOSUB1020:T=T+1:GOSUB1110
1470 REM IS IT A BUST???
```

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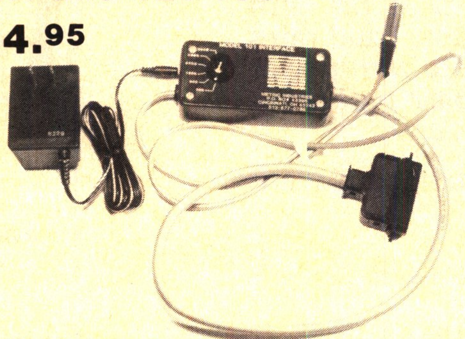

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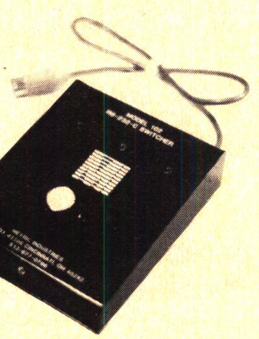

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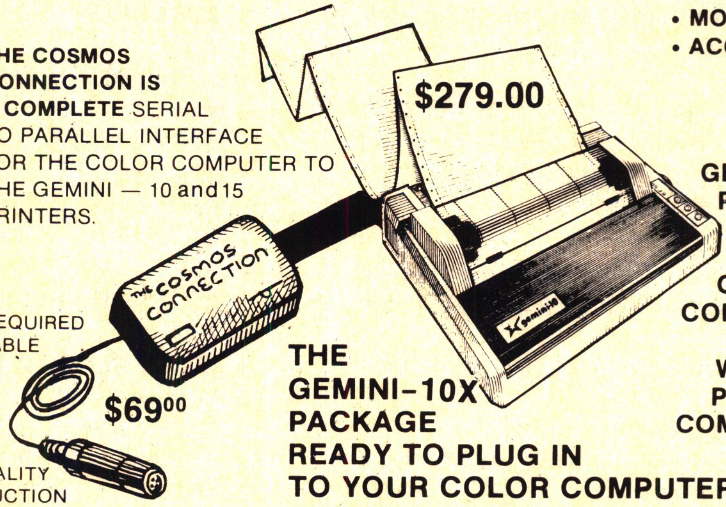
```
1480 IFT(1)+T(2)+T(3)+T(4)+T(5)>
21THEN Z=1:GOTO2480
1490 GOSUB3050:GOSUB3700:GOSUB29
00:IFT=4THEN1510ELSE IFT=5THEN15
20
1500 ON HH GOTO1530,1540,1550,15
60
1510 ON HH GOTO1570,1580,1590,16
00
1520 ON HH GOTO1610,1620,1630,16
40
1530 PUT(98,144)-(118,174),C:GOT
O1660
1540 PUT(98,144)-(118,174),E:GOT
O1660
1550 PUT(98,144)-(118,174),F:GOT
O1660
1560 PUT(98,144)-(118,174),G:GOT
O1660
1570 PUT(130,144)-(150,174),C:GO
TO1660
1580 PUT(130,144)-(150,174),E:GO
TO1660
1590 PUT(130,144)-(150,174),F:GO
TO1660
1600 PUT(130,144)-(150,174),G:GO
TO1660
1610 PUT(160,144)-(180,174),C:GO
TO1660
1620 PUT(160,144)-(180,174),E:GO
TO1660
1630 PUT(160,144)-(180,174),F:GO
TO1660
1640 PUT(160,144)-(180,174),G
1650 REM GO PUT NUMBER OF CARD
 AND MAKE SURE THAT IT IS LEGAL
1660 GOSUB2930:GOSUB3440
1670 IFT(1)+T(2)+T(3)+T(4)+T(5)>
21THEN Z=1:GOTO2480ELSE IFT=5THE
N F=1:GOTO2100ELSE1380
1680 REM SUBROUTINE TO SET SCREE
N TO PLACE BET
1690 DRAW"BM228,86S6":R$="W":GOS
UB650:DRAW"BM228,150":R$="B":GOS
UB650:DRAW"BM228,18":R$="P":GOSU
B650:DRAW"BM225,52":GOSUB3520:GO
SUB3630:DRAW"BM210,116":GOSUB363
0:RETURN
1700 REM SUBROUTINE TO PLACE BET
1710 LINE(0,178)-(220,191),PRESE
T,BF: DRAW"BM10,190C4S4":R$="P F
OR PLAY B FOR BET":GOSUB650
1720 IFA5$="K"THEN1730ELSE1750
1730 A$=INKEY$:IFA$=CHR$(10)THEN
K=155ELSEK=30
1740 GOTO1760
1750 J=JOYSTK(0):K=JOYSTK(1):IF
K<30THEN K=30ELSE K=155
```



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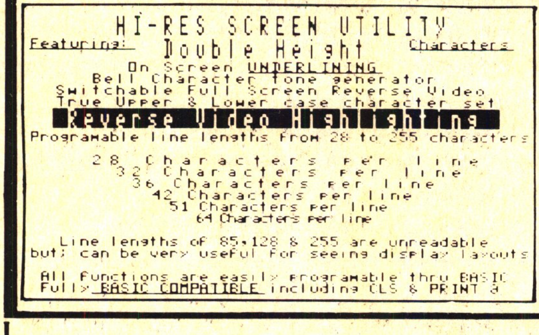
```
1760 COLOR4
1770 REM WANT TO LOOK AT
        STANDINGS
1780 QQ$=INKEY$:IFQQ$="S"THENGOS
UB3350
1790 LINE(228,K)-(238,K+10),PSET
,BF
1800 REM PLAY OR BET
1810 LINE(228,K)-(238,K+10),PRES
ET,BF
1820 IF(A$=CHR$(10)OR A$=CHR$(94
)OR PEEK(339)=254)THEN A$="":GOT
O1840
1830 IFA5$="K"THEN1730ELSEGOTO17
50
1840 IFK=30AND E=1 THEN PLAY"O4L
200T200DL100GL200DL100GL200DL100
GP1":RETURN ELSEIF K=30AND E=0 T
HEN950
1850 E=1:IF W=0THEN RETURN
1860 COLOR1:LINE(162,50)-(235,66
),PSET,BF
1870 FORX=1TO5:PLAY"T250L250O5BL
250G
1880 NEXT
1890 W=W-1
1900 IF W>9THEN1960
1910 DRAW"BM225,52C4S6":IFW=0THE
N1920ELSE X=W:GOSUB3470
1920 COLOR1:LINE(162,114)-(208,1
30),PSET,BF
1930 B=B+1:IF B>9THEN2000
1940 DRAW"BM196,116C4S6":X=B:GOS
UB3470
1950 GOTO1750
1960 IFW>99THEN1980ELSE U=INT(W/
10):V=(W-U*10):DRAW"BM211,52C4S6
":X=U:GOSUB3470:X=V:GOSUB3470
1970 GOTO1920
1980 R=INT(W/100):U=INT((W-R*100
)/10):V=W-(R*100)-(U*10):DRAW"BM
196,52C4S6":X=R:GOSUB3470:X=U:GO
SUB3470:X=V:GOSUB3470
1990 GOTO1920
2000 U=INT(B/10):V=B-(U*10):DRAW
"BM180,116C4S6":X=U:GOSUB3470:X=
V:GOSUB3470
2010 IFB=99THEN1000ELSEGOTO1750
2020 RETURN
2030 REM HOUSE FLIP CARDS
2040 GOSUB1020:PUT(124,60)-(162,
B0),B
2050 GOSUB3440
2060 FORX=1TO70:NEXT:LINE(120,50
)-(156,80),PRESET,BF
2070 PUT(116,40)-(154,60),A
2080 GOSUB3440
2090 FORX=1TO70:NEXT:LINE(116,40
)-(154,60),PRESET,BF:RETURN
2100 IF F=1THEN2150
2110 REM DEAL HOUSE DOWN CARD
2120 GOSUB2040:PUT(94,4)-(114,34
),D:GOSUB3440:RETURN
2130 GOSUB3440
2140 REM DEAL THE HOUSE UP CARDS
2150 FORX=1TO500:NEXT:FORT=6TO10
:GOSUB3050:GOSUB3700:IFT=6THENGO
SUB3180:GOTO2160ELSE GOSUB2040:G
OSUB3180:IFT=7THEN2170ELSEIFT=8T
HEN2180ELSEIFT=9THEN2190ELSEIFT=
10THEN2200
2160 ON HH GOTO2220,2230,2240,22
50
2170 ON HH GOTO2270,2280,2290,23
00
2180 ON HH GOTO2320,2330,2340,23
50
2190 ON HH GOTO2370,2380,2390,24
00
2200 ON HH GOTO2420,2430,2440,24
50
2210 REM FIRST CARD
2220 PUT(94,4)-(114,34),C:GOTO24
60
2230 PUT(94,4)-(114,34),E:GOTO24
60
2240 PUT(94,4)-(114,34),F:GOTO24
60
2250 PUT(94,4)-(114,34),G:GOTO24
60
2260 REM SECOND CARD
2270 PUT(122,4)-(142,34),C:GOTO2
460
2280 PUT(120,4)-(140,34),E:GOTO2
460
2290 PUT(120,4)-(140,34),F:GOTO2
460
2300 PUT(120,4)-(140,34),G:GOTO2
460
2310 REM THIRD CARD
2320 PUT(150,4)-(170,34),C:GOTO2
460
2330 PUT(150,4)-(170,34),E:GOTO2
460
2340 PUT(150,4)-(170,34),F:GOTO2
460
2350 PUT(150,4)-(170,34),G:GOTO2
460
2360 REM FORTH CARD
2370 PUT(175,4)-(195,34),C:GOTO2
460
2380 PUT(175,4)-(195,34),E:GOTO2
460
2390 PUT(175,4)-(195,34),F:GOTO2
460
2400 PUT(175,4)-(195,34),G:GOTO2
460
2410 REM FIFTH CARD
```

HI — RESOLUTION SCREEN UTILITY



```
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32 Characters per line
36 Characters per line
42 Characters per line
51 Characters per line
64 Characters per line

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but; can be very useful for seeing display layouts

All functions are easily programable thru BASIC
Fully BASIC COMPATIBLE including CLS & PRINT @
```

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INTRODUCING

TEXTPRO III

"The Professionals" Word Processing System

Display Formats 28 to 255 x 24

64K Support

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- **True Upper/Lower Case Display**
- **Three Programmable Headers**
- **Programmable Footer**
- **Automatic Footnote System**
- **Automatic Memory Sense 16-64K**
- **Up to 48K of Workspace on 64K**
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- **7 Tab Function Commands**
- **Automatic Justification**
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- **Edit Files Larger Than Memory**
- **Compatible with All Printers**
- **Easily Imbed Any Number of Format and Control Codes**
- **Typist Friendly Line and Command Format Entry**
- **Automatic Key Repeat**

TEXTPRO III is the most advanced Text Editing and Word Processing System available for the Color Computer. One of the reasons for this is, Textpro works in a totally different way than the other Color Computer Word Processing programs. It uses simple 2 character abbreviations of words or phrases for commands. These commands are used at the beginning of a line and are preceeded by a "." period. Several commands can be chained together on the same line for ease of use. Thru these commands you tell the Word Processor how you want the margins set, line length, indenting information, and so on. You can change the way you want a document formatted at any point in the document. You also have the freedom to write without worrying about how long the line is or where the margins are and so on. The Word Processor automatically takes words from one line to the next and fills out the printed line to the desired length. You can even use the command to Input Text from the Keyboard while a document is being processed, and use that information to change the formatting or enter any other valid text Processor command. With this kind of flexibility and an extensive set of commands and functions available, its no wonder that TEXTPRO III is the most advanced Word Processing System.

Screen Formatting

Textpro III has 9 Hi-Resolution Upper/Lower case display formats available, from 28 to 255 characters per line by 24 lines. You also have advanced screen commands such as double size characters and on screen underlining. You can also use the standard 32 by 16 display for systems having lower case hardware kits installed. The display defaults to a 51 by 24 format that is easily switched to any other format available. Along with the Hi-Resolution screen we added automatic repeating keys "Typomatic." The rate is fully adjustable from ultra fast to super slow or can be turned off entirely for your convenience.

64K Support

Textpro III fully supports the use of 64K on the Color Computer. It has fast automatic memory sensing and configures itself accordingly. Textpro III does not require Extended Basic or Flex to take full advantage of a 64K RAM system. On a 64K Disk System there is over 64K of workspace available and files larger than memory are fully supported. Tape based systems have up to 48K available for workspace.

Text Editor

Textpro III has a full featured, line oriented screen editor. It supports single or multiple line copy and move, global or local search and replace of any character string, character insert and delete, block delete, adjustable speed automatic key repeat, single and automatic line edit, programmable underline and double width control coded, change screen background color and line lengths, automatic line numbering, line resequencer, and insert and delete line numbers.

Disk & Tape I/0

Textpro III uses fully compatible ASCII formatted files that do not have to be converted like some of the other Word Processing Systems. It will load, save and verify basic ASCII formatted tape files. The disk version supports Load, Save, Directory, Kill, Append, Text Process file from Disk, Roll part of file to disk and get next portion of file from disk.

DISK $59.95 **TAPE $49.95**

Standard Commands

Textpro III features a whole host of Document Formatting commands. The setup command section includes: Line Length, Top, Left, and Bottom Margins, Page Length, Page Numbering on/off and Automatic Word Fill and Justification on/off.

Some of the vertical control features include: test for number of lines left on the page, skip to next page, set page number, wait at top of page, single and multi line spacing, and skip blank lines.

Textpro III features 3 programmable header lines that can be centered, left or right justified. It also has one programmable footer line. 3 commands for continues, single and paragraph indenting, center text, underline and double width print commands.

Footnotes and Special Commands

Some of the special features allow imbedded control codes to access intelligent printer features like; superscript, subscript, change type font and even graphics. You can even imbed control codes within justified text. There is a command that automatically places footnotes at the bottom of the page, which can be very handy for term papers, etc. Another command allows you to display a message on the screen and input text from the keyboard. This text is then printed as if it has been part of the original text, thus you can produce things like a personalized form letter. There is also a repeat command that allows you to repeat an entire document or a part of one as many times as needed up to 255 times. This can be used to produce mailing labels or combined with the previous command to produce a selected number of personalized form letters.

Tab Functions

Textpro III features an elaborate system of tab commands for complete control over column formatting. There are 10 programmable tab stops that can be defined or re-defined at any time in the text file. They can be used with the following tab commands; Center Over Tab Column, Right Justify to Tab Column, Decimal Align Over Tab Column, Left Justify to Tab Column (Normal Tab) and Horizontal Tab. Tab functions may also be used with a numeric tab column position for maximum flexibility. You can also define the Tab Fill Character to any printable character to fill in the blanks with dots, dashes, etc.

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```
2420 PUT(197,4)-(217,34),C:GOTO2
460
2430 PUT(197,4)-(217,34),E:GOTO2
460
2440 PUT(197,4)-(217,34),F:GOTO2
460
2450 PUT(197,4)-(217,34),G:GOTO2
460
2460 GOSUB3200:GOSUB3440:GOSUB30
70:IFZ=0THENNEXT
2470 REM *** RESULTS ***
2480 DRAW"BM32,126C4S6":IFZ=1 TH
EN R$="BUST":GOSUB650ELSE IFZ=2
THEN R$="WIN":GOSUB650ELSE IFZ=3
 THEN R$="TIE":GOSUB650ELSE IFZ=
4THEN R$="LOSE":GOSUB650
2490 IFZ=1THEN2500ELSE IFZ=2THEN
2520ELSEIFZ=3THEN2540ELSE IFZ=4
THEN2500
2500 FORX=1TO5:PLAY"L100T50O2AL1
50GL100AL150DO1L1DDD"
2510 NEXT:GOTO2560
2520 FORX=1TO3:PLAY"L100O4DADADA
DADAO2L50ADADO5L50DFG
2530 NEXT:GOTO2560
2540 FORX=1TO4:PLAY"T250L250BDBD
BDBDBDBDBDBD"
2550 NEXT
2560 FORX=1TO1000:NEXT:LINE(162,
114)-(208,130),PRESET,BF
2570 LINE(162,50)-(235,66),PRESE
T,BF:IF(Z=1OR Z=4)THEN2630ELSEIF
W<0THEN2830
2580 IFZ=2THEN2590ELSE IFZ=3THEN
2610
2590 IFG=21OR T(5)>0THEN2600ELSE
 W=W+(B*2):GOTO2630
2600 W=W+(B*3):GOTO2630
2610 W=W+B
2620 REM ADD WINNINGS
2630 IFW>9THEN2650
2640 DRAW"BM225,52S6":ON W GOSUB
3620,3500,3510,3520,3530,3540,35
50,3560,3570:GOTO2830
2650 IF W>99THEN2700
2660 U=INT(W/10):V=W-(U*10):DRAW
"BM210,52"
2670 X=U:GOSUB3470
2680 X=V:GOSUB3470
2690 GOTO2830
2700 IFW>999THEN2770
2710 R=INT(W/100):U=INT((W-R*100
)/10):V=W-(R*100)-(U*10):DRAW"BM
196,52"
2720 X=R:GOSUB3470
2730 X=U:GOSUB3470
2740 X=V:GOSUB3470
2750 GOTO2830
2760 REM BANK LOST ALL MONEY
          YOU WIN THE COMPUTER.
2770 FORX=1TO500:NEXT:PCLS:DRAW"
BM32,116S6C3":R$="BANK BUSTED":G
OSUB650
2780 FORX=1TO4000:NEXT:PCLS:DRAW
"BM32,20S4":R$="FOR A NEW GAME":
GOSUB650:DRAW"BM32,60":R$="PRESS
 Y":GOSUB650:DRAW"BM32,100":R$="
ANY OTHER KEY":GOSUB650:DRAW"BM3
2,140":R$="TO EXIT":GOSUB650
2790 REM ANOYHER GAME???
2800 A$=INKEY$:IFA$=""THEN2800
2810 IFA$<>"Y"THEN4410
2820 NG=1:W=4:Z=2:GOTO200
2830 IFW=0THEN3310ELSE LINE(30,1
12)-(100,140),PRESET,BF
2840 LINE(88,2)-(216,36),PRESET,
BF
2850 LINE(30,142)-(182,174),PRES
ET,BF
2860 FORX=1TO10:T(X)=0:NEXT
2870 B=0:F=0:E=0
2880 GOTO950
2890 REM GET READY TO DRAW
         NUMBERS
2900 DRAW"S4":IF T=1THEN DRAW"BM
40,148"ELSE IF T=2THEN DRAW"BM72
,148"ELSE IF T=3THEN DRAW"BM102,
148"ELSE IF T=4THEN DRAW"BM134,1
48"ELSE IF T=5THEN DRAW"BM167,14
8"
2910 D=RND(13):GOSUB4390:RETURN
2920 REM DRAW NUMBER
2930 ON D GOSUB3490,3500,3510,35
20,3530,3540,3550,3560,3570,3580
,3590,3600,3610
2940 IFD=11OR D=12OR D=13THEN D=
10
2950 IFD=1 AND T(1)+T(2)+T(3)+T(
4)+T(5)+11<22THEN D=11
2960 IF T=1THEN T(1)=D
2970 IFT=2THEN T(2)=D
2980 IFT=3THEN T(3)=D
2990 IFT=4THEN T(4)=D
3000 IFT=5THEN T(5)=D
3010 REM WILL ACE BE 1 OR 11
3020 FORX=1TO5:IFT(X)=11AND T(1)
+T(2)+T(3)+T(4)+T(5)>21THEN T(X)
=1
3030 NEXT:RETURN
3040 REM COLOUR OF CARD
3050 X=RND(100):IF X>50THEN COLO
R C:N=1:RETURNELSE COLOR1:N=0:RE
TURN
3060 REM WIN OR LOSE
3070 G=T(1)+T(2)+T(3)+T(4)+T(5):
H=T(6)+T(7)+T(8)+T(9)+T(10):IF G
<H AND H>16 AND H<22 THEN Z=4 EL
SE IF G>H AND H>16 THEN Z=2 ELSE
```

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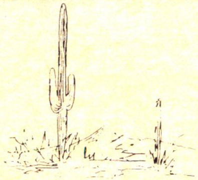
```
 IF G=H AND H>16 THEN Z=3 ELSE I
F H>21 THEN Z=2 ELSE Z=0
3080 IFT(5)>0THENGOSUB3110
3090 IFT=10AND T(5)=0 AND H<22TH
EN Z=4
3100 RETURN
3110 IFH>21THEN Z=2:RETURN
3120 IFH<22AND T(10)=0THEN Z=0:R
ETURN
3130 IFG<H AND H<22THEN Z=1
3140 IFG>H THEN Z=2
3150 IFG=H THEN Z=3
3160 RETURN
3170 REM POS. NUMBER FOR CARD
   AT PROPER LOCATION ON SCREEN
3180 DRAW"S4":IFT=6THEN DRAW"BM9
4,6"ELSE IFT=7THENDRAW"BM124,6"E
LSE IFT=8THEN DRAW"BM152,6"ELSE
IFT=9THEN DRAW"BM171,6"ELSE IFT=
10THEN DRAW"BM201,6"
3190 D=RND(13):GOSUB4390:RETURN
3200 ON D GOSUB3490,3500,3510,35
20,3530,3540,3550,3560,3570,3580
,3590,3600,3610
3210 IFD=11OR D=12OR D=13THEN D=
10
3220 IFD=1 AND T(6)+T(7)+T(8)+T(
9)+T(10)+11<22THEN D=11
3230 IFT=6THEN T(6)=D
3240 IFT=7THEN T(7)=D
3250 IFT=8THEN T(8)=D
3260 IFT=9THEN T(9)=D
3270 IFT=10THEN T(10)=D
3280 FORX=6TO10:IFT(X)=11AND T(6
)+T(7)+T(8)+T(9)+T(10)>21THEN T(
X)=1
3290 RETURN
3300 REM MORE MONEY????
3310 W(P1)=W:CLS3:PRINT@64,"PLAY
ER"P1"YOU ARE OUT OF MONEY.   PR
ESS <Y> FOR FORTY MORE        DO
LLARS FROM THE BANK ...       EL
SE PRESS <N> FOR NO           MO
RE MONEY!!
3320 A$=INKEY$:IFA$="Y"OR A$="N"
THEN3330ELSE3320
3330 IFA$="N"THEN3350ELSEW(P1+4)
=W(P1+4)-4:W=4:W(P1)=W
3340 IFA$="Y"THENPMODE4:PMODE3
3350 FORX=1TO P:Z(X)=W(X+4)+W(X)
:NEXT
3360 IFA$="N"THEN W(P1+4)=0
3370 REM SCORE
3380 CLS:PRINT@64,"IF YOU CASHED
 IN AT THIS POINT  HERE IS WHAT
YOU WOULD END      UP WITH ...",
,,"PLAYER ONE, YOU ARE AT"Z(1)*
10"!":IFP<2THEN3400ELSEPRINT"PLA
YER TWO, YOU ARE AT"Z(2)*10"!":I
FP<3THEN3400ELSEPRINT"PLAYER THR
EE, YOU ARE AT"Z(3)*10"!"
3390 IFP<4THEN3400ELSEPRINT"PLAY
ER FOUR, YOU ARE AT"Z(4)*10"!"
3400 PRINT:PRINT:PRINT"PRESS ANY
 KEY TO CONTUINE"
3410 IFPEEK(339)<>255THEN3420ELS
EQ$=INKEY$:IFQ$=""THEN3410
3420 IFQQ$="S"THENQQ$="":PMODE4:
SCREEN1,1:PMODE3:RETURNELSEIFA$=
"N"THEN W=-4:B=0:Z=2:PMODE4:SCRE
EN1,1:PMODE3:GOTO2570
3430 B=0:Z=2:PMODE4:SCREEN1,1:PM
ODE3:GOTO2570
3440 PLAY"V10O2L150AL100DL150A"
3450 RETURN
3460 REM DRAW NUMBERS
3470 ON X GOSUB3620,3500,3510,35
20,3530,3540,3550,3560,3570:IFX=
0THENGOSUB3630
3480 RETURN
3490 DRAW"BD8U3NR6U2E3F3D5BU8BR4
":RETURN
3500 DRAW"BD2E2R2F2G2L2G2D2R6BR4
BU8":RETURN
3510 DRAW"R6D4NL3D4NL6BU8BR4":RE
TURN
3520 DRAW"BR4ND6G4D2R6L2D2BR6BU8
":RETURN
3530 DRAW"NR6D2R4F2D2G2NL4BR6BU8
":RETURN
3540 DRAW"NR6D4NR6D4R6U4BU4BR4":
RETURN
3550 DRAW"R6D2G4D2BR8BU8":RETURN
3560 DRAW"ND8R6D4NL6D4NL6BR4BU8"
:RETURN
3570 DRAW"NR6D4NR6BD4R6U8BR4":RE
TURN
3580 DRAW"D8BR4NR4U8R4ND8BR4":RE
TURN
3590 DRAW"BR2R4L2D6G2H2BD2BR10BU
8":RETURN
3600 DRAW"BD2ND4E2R2F2D4G1NH2NF2
G1L2H2BD2BR10BU8":RETURN
3610 DRAW"D8U4NE4F4BR4BU8":RETUR
N
3620 DRAW"BD2E2D8L2R4BR4BU8":RET
URN
3630 DRAW"BR2R2F2D4G2L2H2U4E2BR8
":RETURN
3650 DRAW"BU8BR4":RETURN
3690 REM SUIT OF CARD
3700 I=RND(2):IF N=0ANDI=1THEN H
H=1ELSEIF N=0AND I=2THEN HH=3ELS
EIF N=1AND I=1THEN HH=2 ELSE IF
N=1 AND I=2 THEN HH=4
3710 RETURN
```



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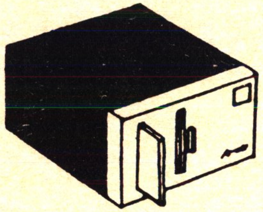

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```
3720 REM *****  rules  ****
3730 CLS:PRINT@74,"BLACKJACK"
3740 PRINT" THE DEAL. THE COMPUT
ER SHUFFLES THE CARDS. CARDS ARE
 DEALT TWO  TO THE PLAYER AND ON
E TO THE    DEALER. THE PLAYER M
AY TAKE     MORE CARDS AT THIS T
IME. WHEN   THE PLAYER STAYS THE
 DEALER     TAKES HIS CARDS.",,,
,"PRESS ANY KEY ..
3750 GOSUB3940
3760 PRINT"   THE BET. IN ORDER
TO PLACE A BET PRESS THE DOWN AR
ROW KEY IF USING THE KEY BOARD,
OR USE THE RIGHT JOYSTICK. IF US
ING THE     JOYSTICK PULL THE STI
CK DOWN     AND PRESS THE BUTTON.
 ONCE A     BET IS PLACED ON THE
TABLE IT"
3770 PRINT"IS FINAL. ALL BETS WI
LL BE MADE IN AMOUNTS OF TEN DOL
LARS. YOU   MAY BET UP TO THE AMO
UNT OF      MONEY THAT YOU HAVE O
R NINE      HUNDRED AND NINETY DO
LLARS       WHICH EVER IS THE GRE
ATER","PRESS ANY KEY ..."
3780 GOSUB3940
3790 PRINT" YOU MAY AT ANY TIME
PASS ON     YOUR TURN BEFORE YOU
PLACE A     BET. TO DO THIS PRESS
 THE UP     ARROW FOR PLAY OR MOV
E THE       JOYSTICK UP AND PRESS
 THE BUTTONBEFORE YOU PLACE A BE
T. AFTER    YOU PLACE A BET FOLLO
W THE SAME"
3800 PRINT"INSTRUCTIONS TO START
 THE PLAY. THE COMPUTER WILL PLA
Y WITH      EACH PERSON IN TURN."
,,,"PRESS ANY KEY ..."
3810 GOSUB3940
3820 PRINT" THE PLAY. THE VALUES
 OF THE     CARDS ARE: ACE 1 OR 1
1, WHICH    EVER WILL BRING YOU C
LOSER TO    21, KING, QUEEN, JACK
, TEN,      10 EACH, ALL OTHER CA
RDS FACE    VALUE.",,"THE OBJECT
OF THE GAME IS TO     HOLD TWO OR
 MORE"
3830 PRINT"CARDS THAT TOTAL TWEN
TY-ONE      OR AS CLOSE TO TWENTY
-ONE AS     POSSIBLE WITHOUT GOIN
G OVER.",,,"PRESS ANY KEY ...
3840 GOSUB3940
3850 PRINT" SETTLEMENT. IF DURIN
G THE DEAL THE PLAYER GOES OVER
TWENTY-ONE THEY HAVE BUSTED AND
LOSE THEIR BET.",,"IF A PLAYER S
TAYS ON THERE     CARDS AND THE
 HOUSE HAS MORE    THEN THE PLAY
ER LOSES AND THEY  LOSE THE BET.
"
3860 PRINT:PRINT"PRESS ANY KEY":
GOSUB3940
3870 PRINT"IF PLAY ENDS IN A TIE
 THE HOUSE GIVES BACK THE BET.",
"IF PLAY ENDS WITH THE PLAYER
 BEING CLOSER TO TWENTY-ONE THAN
 THE DEALER THEN THE PLAYER WINS
.THE HOUSE WILL PAY BACK THE
 AMOUNT BET AND THAT AMOUNT OVER
 AGAIN OR 'DOUBLE' THE BET"
3880 PRINT:PRINT"PRESS ANY KEY":
GOSUB3940
3890 PRINT"IF THE PLAYER WINS AN
D HAS       TWENTY-ONE SHOWING OR
            THE PLAYER HAS WON AN
D HAS       FIVE CARDS SHOWING TH
EN THE      HOUSE WILL PAY TRIPLE
 THE AMOUNTBET.        ",,,,"PRESS
 ANY KEY
3900 GOSUB3940
3910 PRINT"IF A PLAYER HAS NO MO
NEY LEFT    THAT PLAYER MAY BORRO
W MORE      MONEY FROM THE BANK.
FULL TABS   ARE KEPT AND MAY BE S
EEN AT      ANY TIME BY PRESSING
<S>CORE",,,,,,"GOOD LUCK!",,,,"P
RESS ANY KEY .
3920 GOSUB3940
3930 RETURN
3940 A$=INKEY$:IFA$=""THEN3940EL
SE CLS:PRINT@64,"";:RETURN
3950 REM NEXT PLAYER
3960 P1=P1+1:IF P1>P THEN P1=1
3970 LINE(0,0)-(95,10),PRESET,BF
3980 DRAW"BM2,10S4":R$="PLAYER":
GOSUB650:GOSUB3650:ON P1 GOSUB36
20,3500,3510,3520
3990 LINE(162,50)-(235,66),PRESE
T,BF
4000 IF P1=1THEN W(P)=W ELSE W(P
1-1)=W
4010 W=W(P1)
4020 IFW<1THEN WW=WW+1:IF WW=P T
HEN4100ELSE3960
4030 WW=0
4040 IFW>99THEN4070ELSEIFW>9THEN
4060
4050 DRAW"BM225,52C4S6":X=W:GOSU
B3470:RETURN
4060 U=INT(W/10):V=(W-U*10):DRAW
"BM211,52C4S6":X=U:GOSUB3470:X=V
:GOSUB3470:RETURN
4070 R=INT(W/100):U=INT((W-R*100
)/10):V=W-(R*100)-(U*10):DRAW"BM
196,52C4S6":X=R:GOSUB3470:X=U:GO
SUB3470:X=V:GOSUB3470:RETURN
4080 RETURN
```

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```
4090 REM NEW GAME?
4100 CLS:PRINT"IF NOBODY HAS ANY
 MONEY          THEN STEP ASIDE A
ND LET          SOME NEW MONEY AT
 THE TABLE!     PRESS <Y> FOR A N
EW SET UP.
4110 A$=INKEY$:IFA$=""THEN4110EL
SEIFA$="Y"THEN4130
4120 CLS:PRINT"READY FOR INPUT":
END
4130 CLS:PRINT:PRINT:PRINT"    WE
LL I SEE THAT NOBODY HAS     AN
Y MONEY LEFT, SO I THINK     WE
 NEED SOME NEW PLAYERS.":PRINT:P
RINT:PRINT"   HOW MANY PLAYERS(1
/4)
4140 A$=INKEY$:IFA$=""THEN4140EL
SEIFA$>"4"ORA$<"1"THEN4130ELSEP=
VAL(A$)
4150 FORX=1TO P:W(X)=4:W(X+4)=-4
:NEXT:P1=P:W=4:PMODE4:SCREEN1,1:
PMODE3:GOTO2570
4160 REM BANK SCREEN
4170 PMODE4:PCLS:PMODE3
4180 COLORA:LINE(0,0)-(255,20),P
SET,BF:LINE(0,171)-(255,191),PSE
T,BF
4190 DRAW"BM16,16C0S6":R$="CHIPS
 ARE TEN":GOSUB650:DRAW"BM16,188
":R$="DOLLARS EACH":GOSUB650
4200 COLOR0:DRAW"BM140,40S8":R$=
"BANK":GOSUB650
4210 COLORC:LINE(128,45)-(240,48
),PSET,BF
4220 FORX=128TO240STEP16:LINE(X,
48)-(X,100),PSET:NEXT
4230 LINE(123,100)-(245,110),PSE
T,BF
4240 IF SE=1THEN4260ELSECIRCLE(2
24,150),12:PAINT(224,150),C,C
4250 GET(214,138)-(246,168),H
4260 LINE(70,112)-(255,170),PRES
ET,BF:LINE(0,22)-(60,150),PRESET
,BF:PMODE4:SCREEN1,1:PMODE3
4270 FORY=1TO4
4280 ON Y GOSUB4300,4310,4320,43
30
4290 NEXTY:GOTO4350
4300 FORX=136TO22STEP-2:GOSUB434
0:NEXTX:RETURN
4310 FORX=136TO50STEP-2:GOSUB434
0:NEXTX:RETURN
4320 FORX=136TO80STEP-2:GOSUB434
0:NEXTX:RETURN
4330 FORX=136TO110STEP-2:GOSUB43
40:NEXTX:RETURN
4340 PUT(20,X)-(52,X+30),H:PLAY"
L255T255C":RETURN
4350 COLOR0:DRAW"BM80,124S4":R$=
"THE BANK WILL":GOSUB650
4360 DRAW"BM80,138":R$="LEND YOU
 FORTY":GOSUB650:DRAW"BM70,152":
R$="DOLLARS TO START":GOSUB650
4370 IF SE>0THEN DRAW"BM80,166":
R$="AGAIN":GOSUB650:FORX=1TO1000
:NEXT
4380 SE=1:RETURN
4390 FORX=1TO(T-1):IFCC(X)=(D*HH
)THEN4400ELSENEXT:CC(T)=D*HH:RET
URN
4400 IFD=13THEND=1:GOTO4400ELSED
=D+1:GOTO4390
4410 CLS:PRINT"READY FOR INPUT":
END
4420
4430 '*************************
4440 '*************************
4450 '*****  BLACK-JACK   *****
4460 '***** (C) 1983 BY  *****
4470 '*****STEVE KINCADE *****
4480 '***** PRODUCED FOR *****
4490 '*****     KINCADE   *****
4500 '*****  (COMPUTER)  *****
4510 '***** SOFTWARE LTD.*****
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The Mysterious & Unpredictable *RND*

By Bob Albrecht & George Firedrake
***Rainbow* Contributing Editors**

One of the nicest things about the CoCo is the way the *RND* function works. It gives integer random numbers in a way that is easy to understand and use by people who are not math wizards. Most other BASICs give a random number between 0 and 1. We really can't understand why — most applications (especially games!) require integer random numbers. In most BASICs, much mind boggling math is required to get the desired integer random numers.

To get random numbers, 1 or 2:
CoCo: RND(2)
Most others: INT(2*RND(0))+1

Random numbers 1, 2, 3, 4, 5, or 6:
CoCo: RND(6)
Most others: INT(6*RND(0))+1

Try to explain to a nine year old child what INT(6*RND(0)) + 1 means and you will really appreciate *RND(6)* on your CoCo.

If N is a positive integer, then *RND(N)* is a "random" integer from 1 to N. Well, mathematicians might call these numbers *quasi-random* or *pseudo-random* numbers. In deference to the professors, we will call a number produced by the *RND* function an *RND* number. We will propose experiments for you to try so you can learn more about the mysterious and unpredictable behavior of *RND* numbers.

(Bob Albrecht and George Firedrake are two of the most prolific authors in the microcomputer world today. Specialists in writing for beginners, they are authors of numerous books, including TRS-80 Color BASIC.)

EXPERIMENT!

Tell the computer to print an *RND* number.

- Type *PRINT RND(1)* and press [ENTER]. You will get 1 every time.
- Type *PRINT RND(2)* and press [ENTER]. You will get either 1 or 2, unpredictably.
- Type *PRINT RND(1000000)* and press [ENTER]. You will get an *RND* number in the range 1 to 1,000,000.
- Type *PRINT RND(0)* and press [ENTER]. Bonus! *RND(0)* gives *RND* numbers between 0 and 1, just like the other computers. The CoCo gives you the best of both worlds.
- Try *RND(-1)* or *RND(-2)* or *RND* with any negative number. Try the same negative number several times to see what happens.
- Try *RND(.8)* or *RND(1.5)* or *RND(2.7)* or *RND(3.2)*, and so on. Experiment and draw your own conclusions.

In this episode of "GameMaster's Apprentice," we will stick to integer *RND* numbers.

SIMPLE SIMULATIONS

You can use *RND* numbers to *simulate*, or imitate, real life events. Here are some little examples.

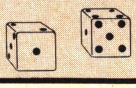
```
100 REM**COIN FLIPPER GMA 16-1
110 CLS
200 REM**TELL WHAT TO DO
210 PRINT "PRESS A KEY & I'LL FL
IP A COIN."
220 IF INKEY$="" THEN 220
300 REM**FLIP & TELL & GO AROUND
310 COIN = RND(2)
```

```
320 IF COIN=1 THEN PRINT "HEADS"
330 IF COIN=2 THEN PRINT "TAILS"
340 PRINT
350 GOTO 210
```

Enter and *RUN* the program. When the CoCo tells you PRESS A KEY & I'LL FLIP A COIN, press most any key (except [BREAK] or [SHIFT] to get a simulated coin flip.

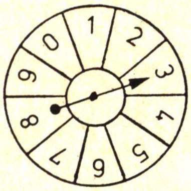
Next, simulate rolling a single six-sided die. Change a few lines in COIN FLIPPER to get DIE ROLLER.

```
100 REM**DIE ROLLER GMA 16-2
110 CLS
200 REM**TELL WHAT TO DO
210 PRINT "PRESS A KEY & I'LL RO
LL A DIE."
220 IF INKEY$="" THEN 220
300 REM**ROLL & TELL & GO AROUND
310 DIE = RND(6)
320 PRINT "THE ROLL IS" DIE
330 PRINT
340 GOTO 210
```



Lots of games use spinners to generate "random numbers." Here is a spinner simulator. It simulates random decimal digits.

```
100 REM**SPINNER GMA 16-3
110 CLS
200 REM**TELL WHAT TO DO
210 PRINT "PRESS A KEY & I'LL SP
IN A DIGIT"
220 IF INKEY$="" THEN 220
300 REM**SPIN & TELL & GO AROUND
310 SPIN = RND(10) - 1
320 PRINT "WHIRRR! I SPIN" SPIN
330 PRINT
340 GOTO 210
```



Of course, the *big* spinner is the roulette wheel. It spins numbers 00,0, and 1 to 36. Hmmm . . . a little trickier than the previous simulations. Aha! We know a way.

```
100 REM**ROULETTE WHEEL GMA 16-4
110 CLS
200 REM**TELL WHAT TO DO
210 PRINT "PRESS A KEY--I'LL SPI
N THE WHEEL"
220 IF INKEY$="" THEN 220
300 REM**SPIN & TELL & GO AROUND
310 SPIN = RND(38) - 2
320 PRINT "AROUND SHE GOES!"
330 PRINT "AND STOPS ON";
340 IF SPIN=-1 THEN PRINT " 00"
ELSE PRINT SPIN
350 PRINT
360 GOTO 210
```

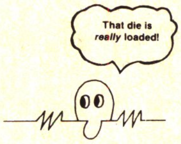
Perhaps a little explanation is in order. In line 310, the value of SPIN will be a number from -1 to 36.

RND(38) is a number from 1 to 38.
RND(38) -2 is a number from -1 to 36.

Line 340 checks for -1. If SPIN is -1, the CoCo prints double zero (00). Otherwise (*ELSE*), it prints the value of SPIN. If SPIN is not -1, it must be 0 to 36.

UNFAIR! UNFAIR!

If you flip a fair coin, you get heads about half the time and tails about half the time. If you roll a fair die, you get a number from 1 to 6. Each possible number has the same chance, or *probability*, of occurrence. If not — beware! — maybe the die is "loaded."


That die is *really* loaded!

Here are some ways to load the die in our *Die Roller* program. Rewrite block 300 in one of these ways.

```
300 REM**ROLL & TELL & GO AROUND
310 DIE = RND(7)
320 PRINT "THE ROLL IS";
330 IF DIE<7 THEN PRINT DIE ELSE
 PRINT 2
340 GOTO 210
```

Using the above block 300, what is the probability of getting 1, 3, 5, 6, or 7? What is the probability of getting 2?

```
300 REM**ROLL & TELL & GO AROUND
310 DIE = RND(8)
320 PRINT "THE ROLL IS";
330 IF DIE<7 THEN PRINT DIE
340 IF DIE=7 THEN PRINT 2
350 IF DIE=8 THEN PRINT 5
360 GOTO 210
```

What is the probability of getting 1, 3, 4, or 6? What is the probability of getting 2 or 5?

Now, instead of an unfair die, how about a lopsided coin. In this program, we assign a percentage probability from 0 to 100 percent to HEADS. The CoCo uses this probability when flipping the coin.

```
100 REM**UNFAIR COIN GMA 16-5
110 PH = 60
120 CLS
200 REM**TELL WHAT TO DO
210 PRINT "PRESS A KEY & I'LL FL
IP A COIN."
220 IF INKEY$="" THEN 220
300 REM**FLIP & TELL & GO AROUND
310 C = RND(100)
320 IF C<=PH THEN PRINT "HEADS"
ELSE PRINT "TAILS"
330 PRINT
340 GOTO 210
```

In line 110, we set the probability of getting HEADS (PH) to 60 percent. Change line 110 to suit yourself. Here is another way. Change only lines 110 and 310 as follows:

110 PH = .6
310 C = RND(0)

In line 110, we assign a probability of .6 for HEADS. Line 310 assigns a "random" decimal fraction between 0 and 1 to C. We think the first method, using integer *RND* numbers, is easier for most people to understand.

COUNT THE OUTCOMES

If you flip a fair coin 1000 times, you expect to get near 500 heads, the rest tails. If you roll a fair six-sided die 6000 times, you expect to get each possible number, 1 to 6, about 1000 times, give or take a few.

- For fair coin, the probability of HEADS occurring is 1/2; the probability of TAILS occurring is also 1/2.
- For a fair six-sided die, the probability of any possible occurrence (1 to 6) is 1/6.

For an ideal *RND* function, one of the characteristics is that every possible number has the same probability of occurrence as any other possible number. If the CoCo has an ideal *RND* function, then:

- For *RND(2)*, the probability of getting 1 is 1/2; the probability of getting 2 is also 1/2.
- For *RND(3)*, the probability of getting 1 is 1/3; the probability of getting 2 is 1/3; the probability of getting 3 is 1/3.
- And so on. For *RND(N)*, the probability of getting any number from 1 to N is 1/N.

So, if we tell the CoCo to crank out lots of *RND* numbers, and count how many times each possible number occurs, we might expect to get roughly the same number of occurrences for each possible number. Let's do it.

```
100 REM**COUNT OUTCOMES GMA 16-6
110 DIM COUNT(14)
200 REM**TALK TO USER
210 CLS
220 INPUT "FOR RND(N), WHAT IS N
"; N
230 INPUT "HOW MANY RND NUMBERS"
; SAMPLESIZE
300 REM**SET COUNTS TO ZERO
310 FOR K=1 TO N
320 : COUNT(K) = 0
330 NEXT K
400 REM**COUNT THE RND NUMBERS
410 FOR K=1 TO SAMPLESIZE
420 : RN = RND(N)
430 : COUNT(RN) = COUNT(RN) + 1
440 NEXT K
500 REM**TELL WHAT HAPPENED
510 PRINT
520 PRINT "OUTCOME", "FREQUENCY"
530 FOR K=1 TO N
540 : PRINT K, COUNT(K)
550 NEXT K
600 REM**TELL HOW TO DO AGAIN
610 PRINT "FOR NEW SAMPLE, PRESS
 ANY KEY";
620 IF INKEY$="" THEN 620 ELSE 2
10
```

Enter the program and *RUN* it. First you see:

```
FOR RND(N), WHAT IS N?
```

We want *RND(6)* numbers, so we type the number 6 and press [ENTER].

```
FOR RND(N), WHAT IS N? 6
HOW MANY RND NUMBERS?
```

Let's ask for *600RND* numbers. This is the SAMPLESIZE. We type 600, press [ENTER], wait a little while, and see:

```
FOR RND(N), WHAT IS N? 6
HOW MANY RND NUMBERS? 600

OUTCOME       FREQUENCY
   1             106
   2             97
   3             100
   4             96
   5             99
   6             102
FOR NEW SAMPLE, PRESS ANY KEY;
```

Well, that seems reasonable. Each possible *outcome* (1 to 6) occurred about 100 times. The word *frequency* is from the jargon of probability and statistics books. The frequency of occurrence is simply the number of times each possible outcome occurred.

Try other samples of N=6 and try other values of N, up to 14. The *DIM* statement in line 110 sets a limit of 14 for the array COUNT. Try 12, 13, and 14 as values of N. Then change line 110 and try values of N larger than 14. You will see some of your results scroll off the top of the screen!

Your turn: Write a program to roll an unfair die a bunch of times and count the number of occurrences of each possible outcome, 1 to 6. Use one of our unfair die methods, or invent your own.

Next time we will continue playing with *RND* numbers and also resume cassette files.

FANTASY ROLE PLAYING GAMES

Millions of young people, and many not-so-young, are playing fantasy role playing games. A role playing game is a game in which one or more players create and control characters (adventurers) who live their imaginary lives in a specially made game world. The game world is created, managed, and operated by a GameMaster (GM), also called a referee, adventure master, or dungeon master (DM).

Most people who play role playing games use a formal rule system. Some of the best known are shown below.

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***Dungeons & Dragons (D&D)**. From TSR, P.O. Box 756, Lake Geneva, WI 53147.*

***RuneQuest (RQ)**. From Chaosium, P.O. Box 6302, Albany, CA 94706.*

***Tunnels & Trolls (T&T)**. From Blade, Box 1467, Scottsdale, AZ 85252.*

***Worlds of Wonder (WOW)**. From Chaosium, P.O. Box 6302, Albany, CA 94706.*

*Most programs in "GameMaster's Apprentice" are based on the game system used in **RuneQuest, Worlds of Wonder,** and **Adventurer's Handbook**. If you are a beginner, we suggest you try the following books.*

***Adventurer's Handbook: A Guide to Role Playing Games** by Bob Albrecht & Greg Stafford.*

***Through Dungeons Deep** by Robert Plamondon.*

Both are available from Reston Publishing Company, 11480 Sunset Hills Road. Reston, VA 22090.

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Helpful Hint . . .

Goin' Steady On BBS

Here is a short program to demonstrate how someone may get their messages to print evenly on a BBS.

```
1 REM RICHARD BECK
2 REM KISSIMMEE,FL
10 CLS:CLEAR 1000
20 LINEINPUTA$:CLS
30 GOSUB50
40 IFINKEY$=“”THEN40ELSE20
50 FORP=1TOLEN(A$):PRINTMID$(A$,P,1);
60 X=X+1:IFX>26ANDMID$(A$,P,1)=“ ”THEN
PRINT:X=0
70 IF X=30 THENPRINT“-”:X=0
80 NEXT:X=0:PRINT:RETURN
```

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UTILITY

16K ECB

MEMSCAN—

A Utility For The Memory Explorer

By A. V. Reinhart

So there it was — a super map of all the secrets inside the Color Computer's ROMs. Eagerly, I jumped to the keyboard to begin learning all the internal wonders. . . .

```
PRINT HEX$(PEEK(26))          (Whew!)
  12
  OK
```

Ouch! That was a lot of typing to see only one lousy byte! Very quickly I realized there was a need for a utility which would allow a fast and easy access to memory, with controls that allow one to concentrate on learning about the system and not fight the utility which was supposed to be helping you. My answer to that need is *MEMSCAN*, a simple, easy to use utility which will allow you to move through memory with a single key, see data displayed in Hex or decimal, word or byte or even binary!

MEMSCAN is designed to be very easy to use, but a brief rundown of its major features should prove instructive. First on the list is ease of use. Studying memory needs no aid in being difficult and a utility for this purpose should be as transparent to the user as possible. Once you have entered an address and it is displayed, you can move along, a byte or word at a time, by using an up or down arrow key. Changing to the other modes requires only one or two further keystrokes.

The next important feature in memory exploration is perspective. In the above example of the *PRINT-PEEK* technique, you only ever see one byte at a time, but I've found that being able to see memory a certain "distance" on either side of a location being examined gives a much better feeling for what I'm seeing. *MEMSCAN* displays memory through a "window" whose width is variable. The address you enter is placed at its center, and the span or window-width can be changed in fixed widths of 3, 5, 7, 9, or 11 bytes (or words, depending on the data display mode). The scan in *MEMSCAN* comes from the fact that as you are looking at a particular window of memory, the program has nothing to do but await the next keystroke. Consequently, between keystrokes, *MEMSCAN* keeps re-peeking and re-displaying the current window. This way, when you are viewing a part of memory (try looking around Hex 26) which is dynamic, the actual changes appear on the screen as they occur.

Another necessary feature is radix control. I happen to prefer hexadecimal, but there are times when decimal is more useful. With *MEMSCAN*, you can switch between Hex and decimal at the stroke of a key! Beginners will appreciate this feature — it may help them to become more comfortable with Hex and enjoy its convenience.

Data interpretation: One of the most confusing aspects of computer work, even for professionals. For example, if a location in memory contains a decimal value of 70, it could

(Alan Reinhart is a self-taught programmer currently working as a senior software engineer with Digilog, Inc. He says that working with OS-9 and the CoCo is a relief from the tedium of CP/M.)

be taken as just that — an unsigned integer with a magnitude of 70. However, it could also be taken as the 2's complement of 130960, or it could be the character F. It could also be taken as the high byte of an address, in which case it would really represent 70*256 or 17920. If the computer were executing a program from this area of memory, this byte becomes a ROtate Right, accumulator A (RORA) instruction. *MEMSCAN* arms the intrepid memory explorer with just the tools to tame this tangle. You will be able to see the contents of a given location as a word, a byte, a character or as a binary value. Note — technically, binary is really another radix (base 2), but to simplify the program design I chose to consider it as a variation of the data display.

Finally, there is indirection. Often when the computer opens a location in memory in the process of executing instructions, the data extracted is not the data needed (not the operand), but the address of the needed data. The original address is said to hold what is called a pointer to the operand. Another way of saying this is that the original address is the "address of the address of the data." Welcome to indirection! An example: Location 25-6 decimal contains the start address of the first line of a BASIC program. Location 25-6 is the address of the address of the first line of the program. With *MEMSCAN*, studying indirection will be a snap. Just place the address of the data you'd like to use as an address in the center of the display (it will be showing in the ADRS window), and press the right arrow key!

Using *MEMSCAN*

MEMSCAN has two primary modes of operation: Configuration mode and Display mode. In Configuration you select what address you wish to examine, what radix to use, etc. Once the parameters have been selected and [ENTER] has been hit, you go to Display mode. In Display you can move forward or backward through memory, move down some level of indirection, or return to Configuration. Hitting the [CLEAR] key in display will exit the utility to BASIC. Note — the [BREAK] key is *not* disabled. If you break out of *MEMSCAN*, be aware that it has *POKEd* the computer to run at double speed, and should you attempt to *SAVE* anything without resetting the computer you will have saved garbage! Exiting cleanly through the [CLEAR] key restores the CPU to its normal "half-speed" operation.

After you type "RUN MEMSCAN," the first thing seen is a blue background with the *MEMSCAN* version number displayed. After a short set-up delay, the five green Configuration fields should appear. The blinking colon in the field marked ADRS is the prompt indicating that is the field to be modified.

Let's go through a Configuration sequence. With the cursor in the ADRS field, enter any four Hex characters. Try the [CLEAR] key as a rubout. If you move on to another field at this point, or exit to Display mode, without entering any address, *MEMSCAN* will default to zero. If a previous address had been entered, and you return to Configuration in the ADRS field, but then changed your mind, moving to another field (or exiting back to Display) without entering a new address, you will continue with the previous address. Use the right arrow, and move to the RADIX field. When the cursor appears, use the up and down arrows and notice how you can toggle between HEX and DEC radix modes. Select your preference, and hit the right arrow again. You will be changing the *DMODE* parameter, and there are four choices in this field: WORD, BYTE, CHAR, and BIN.

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Again, the up or down arrows allow you to scroll through the choices, stopping at the one you wish. The next field, WDO, controls the window width, and the choices are 3, 5, 7, 9 and 11.

After you are satisfied with the Configuration, hit [ENTER] and go to Display mode. Now the up arrow will move you "up" or ahead by one byte or word, depending upon the current *DMODE*. Likewise, the down arrow will move you "down" or back one word or byte. Note that the wider the window, the slower the response. This is an unfortunate result of the FOR loop, and only going to ML will remedy it!

If you use the indirection feature with the display in byte mode, the new address will be formed by taking the data from the address in the ADRS field as the high byte, and the data from ADRS+1 as the low byte. In word mode, you can be misaligned by a byte, when attempting indirect references. If this happens, just go back to Configuration and reenter the address on the correct byte boundary.

Program Design Notes

This utility is a fairly simplistic program with only two major jobs. One is to make sure the displayed address range appears to be circular. That is, address 0 follows address 65535 and vice versa. The second task is to present the data neatly formatted to create the "window-into-memory" look.

The range checking requirement is a result of the fact that RS BASIC has no integer variables, only five-byte floating point numerics. The second task is made more difficult by the fact that the formatting services of *PRINT USING* would not meet the needs of this program. Instead, a rather cumbersome scheme of RIGHT$( )s was used to produce the necessary three, four or five character displays, complete with leading zeros. This technique, incidentally, is probably responsible for a goodly portion of the slow response, especially during decimal word display when the most lengthy formatting is done. After these requirements, the balance of the program consists of the usual keyboard input processing, start-up initialization and support activities.

With the included Symbol Table and Index of Line Numbers, only a brief outline of the program should be necessary to supply enough information for those wishing to customize *MEMSCAN*, or to just follow it through. There are three major sections to *MEMSCAN*: The Display section (60K series lines), the Configuration section (61K series lines), and the one-time initialization section (62K series lines). Here follows a brief outline of the primary functions of each of these sections.

Display Section

Display is controlled from line 60030 where *INKEY$* monitors the keyboard. If nothing is seen, a display scan is done. When a key is struck, its ASCII value is used as the index into a 128-node array (IX) to dispatch to the correct line to handle that key. For a recognized key, the contents of its node in IX() is set equal to the positional value of the key-handler's line number in a companion *ON . . . GOTO* statement. Illegal keys have a node-entry of zero and fall through as if nothing were struck.

The dispatch to the selected display loop is based on the value of variables set during Configuration. A simple tree structure exists in that, first, the radix (CX) is used to branch

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down one of two possible paths. After this, the data mode (DM) is used to select one of two paths, one way for byte, one way for word mode. If the mode is byte, yet another branch can be made for either binary or character data display.

There are eight display loops, one for each possible display combination. It was felt this would provide a speed advantage over a single loop with a variety of conditional checks within. Once in a particular display loop, the processing is essentially the same. It consists of entering a *FOR* loop, range-checking the address and printing the display. During the display, AL represents the lowest address (based on window width) to be displayed, and AC is the "center" address maintained for the indirection feature.

To handle indirection, the center address must first be checked. If it is 65535, the address of the data to make up the new address will be taken from location 0. Otherwise, the data for the new address will be taken from AC and AC+1. Old AC is saved in the array IN( ) with the indirection level counter (IL) as the index. AC is then set to the new address, and control is returned to Display. To return to a previous "level," it is only necessary to set AC equal to IN(IL) and decrement IL. If either indirection level limit is reached (0 or 5), further requests to go up or down are simply ignored.

One feature of the display code is the assembly language routine to convert a byte of data to a string of eight ASCII ones and zeros. At the end of the ML code is a one-byte buffer (BF). Any data to be converted to a binary string is poked into BF. Then a string is set to "00000000"+" " (see Page 150 of "Going Ahead With Color BASIC" for the "why" of the null-terminator on that string). This string is then used in a call to the ML subroutine via a reference to USR0(D$). The ML code takes the data from the buffer, loads it into a register, and performs a series of left-shifts upon it. At the end of each shift, if carry is set, a bit with a value of one had been shifted out of the register, and the byte in D$ corresponding to that bit gets one added to it, making it an ASCII 1. If carry was not set after a shift, that bit was zero, and the corresponding byte in D$ is left alone.

Finally, to return to Configuration mode, the Index array (IX) has entries for the first letter of each of the Configuration parameters (A, R, D and W). Thus, typing any of these characters while in Display mode will cause the appropriate colon to begin blinking, indicating that that parameter can now be altered.

Configuration Section

The Display code performs its task by using the various configuration variables to decide which lines of code to *GOTO* to produce a display. Since there are only a few parameters and their options are all preset, the simplest Configuration scheme is to increment through the possible fields and options. To accomplish this, a general purpose "get-arrow" subroutine is used. This routine monitors the keyboard via *INKEY$* and recognizes only the four arrow keys and the [ENTER] key. The up/down arrows are returned to the caller as variable X, set to a value of plus or minus one. The right and left arrows and the [ENTER] key are returned in TE$ as the termination character. On return from get-arrow, if TE$ is null (""), the caller adds X to the variable being altered, does a range check, displays the current value of the parameter, and returns to get-arrow. This process continues until a terminator is received. The display of the selected parameters is done by keeping an array for each, containing a string describing the possible options. The control variable is then used as the index into the companion array to display the meaning of its value. For example, if the current radix is hexadecimal, CX will equal one, and node 1 of the radix array (RX$) contains the string "Hex."

When get-arrow is in its *INKEY$* loop, if nothing has been received, before looping back for another *INKEY$* scan, it calls the Configuration prompt subroutine. Each caller to get-arrow supplies a screen address for the blinking colon prompt. Each call to the prompt subroutine alternates the prompt between a colon and a blank character. To ensure there is always a colon displayed, before returning to the caller, a final colon is printed at the current cursor address.

Upon return from get-arrow, if a terminator character has been received, the handler sets NX equal to its positional value in the display screen (ADRS=1, RADIX=2, etc.) and jumps to the next-step handler. This routine performs some conditional display updating and then evaluates TE$. If it was a left or right arrow, NX is incremented or decremented and used as the argument for an *ON . . . GOTO* statement. If the terminator was an [ENTER] key, control is returned to Display at line 60020.

Lastly, Configuration has a "clear screen" routine which eases the problem of changing display formats. On each call to this routine the screen is cleared (CLS3), and the configuration windows are rewritten. The indirection flag (an orange block) is set if the indirection level is greater than zero, and cleared if equal to zero.

MEMSCAN was written for a specific purpose: To make studying memory as simple and efficient as possible. While there are many forms of memory examination programs, I feel this is an optimum approach. For example, *EDTASM+* allows you easy access to memory, even to disassemble it into mnemonics. But that is a different environment with controls and displays suited to debugging. *MEMSCAN* is meant to be used along with your favorite ROM map, to assist you in peeking around and learning. You could even merge it with an existing program and study its components.

MEMSCAN does run a bit on the gummy side, with the delays being most noticeable in the wide (seven and above) window widths. However, I feel its ease of use and transparent nature should far outweigh this limitation.

So, grab those maps, jump to the keyboard, and *RUN MEMSCAN*!

Configuration Mode Command Keys

← Go to previous Parameter Field
→ Go to next Parameter Field
↑ Go to next Parameter Option
↓ Go to previous Parameter Option
[ENTER] key terminates Configuration mode — enter Display mode.
[CLEAR] key acts as "rubout" key during address input.
Blinking colon indicates Parameter Field to be altered.

Display Mode Command Keys

↑ Advance to next byte/word
↓ Advance to previous byte/word
→ Go down one level of indirection
← Come up one level of indirection
[CLEAR] key exits *MEMSCAN*, returns to RS BASIC.
To reenter Configuration mode, the first letter (A, R, D or W) will terminate Display mode and enter Configuration mode.

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MEMSCAN Symbol Table - i

Arrays

IX(127)	Index array for key processing in Display loop.
IN(5)	Records previous center address for Indirection.
WW$(5)	Text of window width options.
MD$(4)	Text of data display options.
RX$(2)	Text for current radix indication.

Fixed Screen Locations

AF	Address title field (ADRS:)
RF	Radix title field (RADIX:)
NF	Indirect level title field (IND:)
MF	Data mode title field (DMODE:)
WF	Window width title field (WDO:)
AI	Input address data field
RI	Radix Display Field
NI	Indirect level Display Field
WI	Window width Display Field
AA	Start of displayed address
DD	Start of displayed data

MEMSCAN Symbol Table - ii

Major Variables

A,D	Address and Data temp variables in display loop
AC	Current center address
AL	Current low address; based on window width
B$	String of spaces, used to erase the Address-input field
CF	Cursor field; used by "get-arrow" subroutine
CX	Current radix (Hex=1, Dec=2)
CG	Change flag; indicates a Configuration parameter has changed
D$	Data in string form; used in display loops
DM	Current data display mode (Byte=1, Word=2)
F	Added to AC forms AL
I	Loop counter, used in all display loops
K$	Raw input from *INKEY$*
LP	Terminal value for display FOR loops
MI	Mode Index (1-4); derives DM & SB
ML	Maximum indirect level (5)
MM	Start address of ML subroutine which makes binary strings
NX	Next Configuration field to alter
SB	Special byte display (Binary=1, Character=2, Not in use=0)
TE$	Terminator character returned from "get-arrow"
WI	Window width index; used to display current width
WW	Current window width (WW=WI*2+1)

Miscellaneous Constants

MX = 65536

C1,C2, CU=	Blinking cursor components
C3	Indirection "on" flag
C4	Erase Indirection Flag Character
UA	ASCII value for up arrow
DA	ASCII value for down arrow
LA	ASCII value for left arrow
RA	ASCII value for right arrow
CR	ASCII value for[ENTER] key (carriage return)

String Constants

AD$	"ADRS:"
RD$	"RADIX:"
NN$	"IND:"
MO$	"DMODE:"
WD$	"WDO:"

MEMSCAN Line Numbers - i

60000 - Display Section	
-010	Display loop; key processing; inc/dec address
-110	Hex word mode display loop
-140	Hex byte mode display loop
-180	Hex address, Binary data display loop
-210	Hex address, Character data display loop
-250	Decimal word mode display loop
-290	Decimal byte display loop
-330	Decimal address, Binary data display loop
-360	Decimal address, Character data display loop
-400	Center address display subroutine
-450	Go up one level of indirection
-470	Go down one level of indirection
61000 - Configuration Section	
-010	Address input handler
-170	Radix handler
-210	Mode handler
-250	Window width handler
-290	Next step handler
-380	Screen rewrite subroutine
-420	"Get-arrow" subroutine
62000 - Initialization Section	
-010	Speed-up poke
-020	Define address for ML subroutine (MM=&H7900)
-090	Most start-up Configuration parameters defined on this line
-120	Exit code for [CLEAR] key

60130	127
60270	17
60390	191
61030	240
61220	64
61400	232
62030	121
END	135

The listing:

```
60000 CLEAR250,&H7900:GOSUB62000
:GOTO61010:REM          MEMSCAN U
TILITY V1.0
60010 REM DISPLAY LOOP
60020 LP=WW-1:LP=LP*DM
60030 K$=INKEY$:IFK$<>""THEN ONI
X(ASC(K$)) GOTO 62120,60060,6104
0,61220,61180,61260,60050,60450,
```

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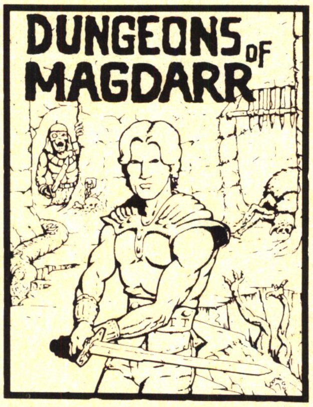

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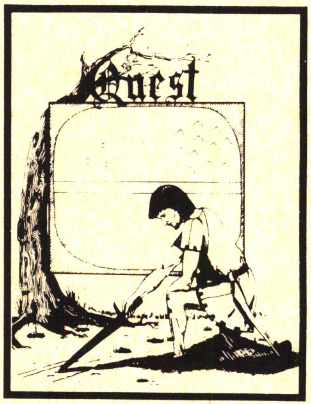

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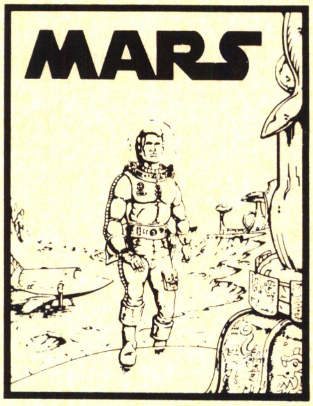

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```
60470
60040 AX=AA:DX=DD:ONCX GOSUB6009
0,60250:IFPEEK(&H155)=&HF7 THEN6
0050 ELSEIFPEEK(&H156)=&HF7 THEN
60060 ELSE60030
60050 AL=AL+DM:GOTO60070
60060 AL=AL-DM
60070 IF AL>65535THEN AL=AL-MX E
LSEIF AL<0THEN AL=MX+AL
60080 GOSUB60400:GOTO60030
60090 REM HEX DISPLAY SECTION
60100 IFDM=1 THEN 60140
60110 REM HEX-WORD DISPLAY
60120 FORI=0TOLP STEP2:Z0=I+AL:I
F Z0>65535THENZ0=Z0-MX:Z1=Z0+1:E
LSE IF Z0=65535 THEN Z1=0 ELSE Z
1=Z0+1
60130 D=PEEK(Z0)*256+PEEK(Z1):PR
INT@AX,RIGHT$("000"+HEX$(Z0),4);
:PRINT@DX,RIGHT$("000"+HEX$(D),4
);:AX=AX+32:DX=DX+32:NEXTI:RETUR
N
60140 REM BYTE-MODE HEX DISPLAY
60150 ON SB GOTO 60180,60210
60160 FORI=0TOLP:A=I+AL:IFA>6553
5THENA=A-MX
60170 D=PEEK(A):PRINT@AX,RIGHT$(
"000"+HEX$(A),4);:PRINT@DX,RIGHT
$("0"+HEX$(D),2);:AX=AX+32:DX=DX
+32:NEXTI:RETURN
60180 REM BINARY BYTES
60190 FORI=0TOLP:A=I+AL:IFA>6553
5THENA=A-MX
60200 PRINT@AX,RIGHT$("000"+HEX$
(A),4);:D=PEEK(A):POKEBF,D:D$="0
0000000"+"":PRINT@DX,USR0(D$);:A
X=AX+32:DX=DX+32:NEXTI:RETURN
60210 REM CHAR BYTES-HEX ADRS
60220 FORI=0TOLP:A=I+AL:IFA>6553
5THENA=A-MX
60230 D=PEEK(A):IFD<&H20 THEN D$
="^"+CHR$(D+&H40)+" " ELSE D$="
"+CHR$(D)+" "
60240 PRINT@AX,RIGHT$("000"+HEX$
(A),4);:PRINT@DX,D$;:AX=AX+32:DX
=DX+32:NEXTI:RETURN
60250 REM DECIMAL HANDLER
60260 IF DM=1 THEN 60290
60270 FORI=0TOLP STEP2:Z0=I+AL:I
F Z0>65535THENZ0=Z0-MX:Z1=Z0+1:E
LSE IF Z0=65535 THEN Z1=0 ELSE Z
1=Z0+1
60280 A$=STR$(Z0):PRINT@AX,RIGHT
$("0000"+RIGHT$(A$,LEN(A$)-1),5)
;:D=PEEK(Z0)*256+PEEK(Z1):D$=STR
$(D):PRINT@DX,RIGHT$("0000"+RIGH
T$(D$,LEN(D$)-1),5);:AX=AX+32:DX
=DX+32:NEXTI:RETURN
60290 REM DECIMAL BYTE MODE
60300 ON SB GOTO 60330,60360
```

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```
60310 FORI=0TOLP:A=I+AL:IFA>6553
5THENA=A-MX
60320 A$=STR$(A):PRINT@AX,RIGHT$
("0000"+RIGHT$(A$,LEN(A$)-1),5);
:D$=STR$(PEEK(A)):PRINT@DX,RIGHT
$("000"+RIGHT$(D$,LEN(D$)-1),3);
:AX=AX+32:DX=DX+32:NEXTI:RETURN
60330 REM DEC-ADRS, BINARY DATA
60340 FORI=0TOLP:A=I+AL:IFA>6553
5THEN A=A-MX
60350 A$=STR$(A):PRINT@AX,RIGHT$
("0000"+RIGHT$(A$,LEN(A$)-1),5);
:D=PEEK(A):POKE&H7916,D:D$="0000
0000"+"":PRINT@DX,USR0(D$);:AX=A
X+32:DX=DX+32:NEXTI:RETURN
60360 REM DEC ADRS, CHAR BYTES
60370 FORI=0TOLP:A=I+AL:IFA>6553
5THEN A=A-MX
60380 D=PEEK(A):IFD<&H20 THEN D$
="^"+CHR$(D+&H40)+" " ELSE D$="
"+CHR$(D)+" "
60390 A$=STR$(A):PRINT@AX,RIGHT$
("0000"+RIGHT$(A$,LEN(A$)-1),5);
:PRINT@DX,D$;:AX=AX+32:DX=DX+32:
NEXTI:RETURN
60400 REM CENTER ADDRESS DISPLAY
60410 IFCG THEN AL=AC-F:IFAL<0TH
ENAL=AL+MX
60420 AC=AL+F:IF AC>65535THEN AC
=AC-MX
```

```
60430 IFCX=1THENDA$=RIGHT$("000"
+HEX$(AC),4) ELSEDA$=STR$(AC):DA
$=RIGHT$("0000"+RIGHT$(DA$,LEN(D
A$)-1),5)
60440 PRINT@A1,DA$;:RETURN
60450 REM MOVE UP 1 LEVEL OF IND
60460 IFIL=0THEN GOTO60030 ELSE
AC=IN(IL):IL=IL-1:GOTO60500
60470 REM MOVE DOWN 1 LEVEL
60480 IFIL=ML THEN GOTO60030 ELS
E IL=IL+1:Z0=AC:IFZ0>65535THENZ0
=Z0-MX:Z1=Z0+1:ELSEIFZ0=65535THE
NZ1=0ELSEZ1=Z0+1
60490 Z0=PEEK(Z0)*256:Z1=PEEK(Z1
):IN(IL)=AC:AC=Z0+Z1
60500 GOSUB60430:AL=AC-F:IFAL<0T
HENAL=MX+AL
60510 GOSUB61380:GOTO60030
61000 REM              CONFIGURA
TION LOOP
61010 GOSUB61380:REM ADDRESS INP
UT HANDLER
61020 SF=A1:IF CX=1THEN MC=4ELSE
MC=5
61030 B$="     ":IFCX=2THENB$=B$+
" "
61040 CF=A1-1:CT=0:K1$="":TE$=""
:CU=C1:F1=A1:PRINT@A1,B$;
61050 K$=INKEY$:IFK$<>""THEN6106
0 ELSE GOSUB61470:GOTO61050
```

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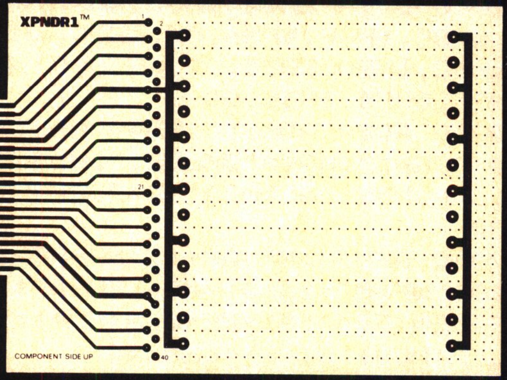

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```
61060 IFASC(K$)=LA THEN61090 ELS
EIF ASC(K$)=RA THEN61090 ELSEIFA
SC(K$)=CL THEN61110ELSEIFASC(K$)
=CR THEN61090
61070 CT=CT+1:IFCT>MC THEN61050
61080 PRINT@F1,K$;:K1$=K1$+K$:F1
=F1+1:GOTO61050
61090 TE$=K$:IFCX=1THEN K1$="&H"
+K1$
61100 ID=VAL(K1$):PRINT@CF,":";:
IF CT THEN GOTO61150 ELSE ID=AC:
GOTO61150
61110 F1=F1-1:IF F1<A1 THEN F1=A
1
61120 CT=CT-1:IFCT<0THENCT=0
61130 K1$=LEFT$(K1$,CT)
61140 PRINT@F1," ";:GOTO61050
61150 F=WW-1:IFDM=1THENF=F/2
61160 AC=ID:NX=1:CG=1:GOTO61290
61170 REM RADIX INPUT HANDLER
61180 CF=R1-1:GOSUB61420:IFTE$<>
""THEN NX=2:GOTO61290
61190 CX=CX+X:IF CX<1THENCX=2ELS
EIFCX>2THENCX=1
61200 PRINT@R1,RX$(CX);:CG=1:GOT
O61180
61210 REM MODE INPUT HANDLER
61220 CF=M1-1:GOSUB61420:IFTE$<>
""THENNX=3:GOTO61290
61230 MI=MI+X:IFMI<1THENMI=4ELSE
IFMI>4THENMI=1
61240 PRINT@M1,MD$(MI);:CG=1:GOT
O61220
61250 REM WINDOW SPAN INPUT HAND
LER
61260 CF=W1-1:GOSUB61420:IFTE$<>
""THENNX=4:GOTO61290
61270 WI=WI+X:IFWI<1THENWI=5ELSE
IFWI>5THENWI=1
61280 PRINT@W1,WW$(WI);:WW=WI*2+
1:CG=1:GOTO61260
61290 REM NEXT-STEP HANDLER
61300 IFMI>2THENDM=1:SB=MI-2:ELS
EDM=MI:SB=0
61310 IFCG THEN F=WW-1:IFDM=1THE
NF=F/2
61320 IF CG THEN GOSUB60400:GOSU
B61380:CG=0
61330 IFASC(TE$)=LA THEN61340ELS
EIFASC(TE$)=RA THEN61350ELSE GOT
O60020
61340 NX=NX-1:GOTO61360
61350 NX=NX+1
61360 IFNX<1THENNX=4ELSEIFNX>4TH
ENNX=1
61370 ON NX GOTO 61010,61170,612
10,61250
61380 REM SCREEN RE/WRITE
61390 CLS3:PRINT@AF,AD$+DA$;:PRI
NT@RF,RD$+RX$(CX);:PRINT@NF,NN$+
RIGHT$(STR$(IL),1);:PRINT@MF,MO$
+MD$(MI);:PRINT@WF,WD$+WW$(WI);
61400 IF IL THEN PRINT@AF-1,CHR$
(C3); ELSE PRINT@AF-1,CHR$(C4);
61410 RETURN
61420 REM 'GET-ARROW' INPUT
61430 TE$="":X=0:CU=C1
61440 K$=INKEY$:IFK$<>""THEN6145
0ELSEGOSUB61470:GOTO61440
61450 IFASC(K$)=UA THENX=1ELSE I
FASC(K$)=DA THENX=-1 ELSE IFASC(
K$)=LA THENTE$=K$ ELSE IFASC(K$)
=RA THENTE$=K$ ELSE IFASC(K$)=CR
 THENTE$=K$ ELSEGOTO61440
61460 PRINT@CF,":";:RETURN
61470 REM BLINKING COLON SUB
61480 PRINT@CF,CHR$(CU);
61490 FOR I=1TO20:NEXTI
61500 IFCU=C1 THENCU=C2 ELSE CU=
C1
61510 RETURN
62000 REM                ONE-TIME
 INIT CODE
62010 POKE 65495,0
62020 CLS3:PRINT@168,"MEMSCAN V1
.0";:MM=&H7900:BF=MM+&H16:DIM IX
(127),RX$(2),IN(5),WW$(5),MD$(4)
:DEFUSR0=MM:MX=65536
62030 MD$(1)="BYTE":MD$(2)="WORD
":MD$(3)="BIN ":MD$(4)="CHAR":RX
$(1)="HEX":RX$(2)="DEC":WW$(1)="
03":WW$(2)="05":WW$(3)="07":WW$(
4)="09":WW$(5)="11"
62040 DATA &H12,&H30,&H98,02,&HE
6,&H8C,&H0F,&H86,08,&H58,&H24,04
,&H6C,&H80,&H20,02,&H30,01,&H4A,
&H26,&HF4,&H39,00
62050 AD$="ADRS:":RD$="RADIX:":N
N$="IND:":MO$="DMODE:":WD$="WDO:
":UA=&H5E:DA=&H0A:LA=8:RA=9:CR=&
H0D
62060 AF=34:RF=AF+12:NF=RF+10:MF
=101:WF=MF+13:A1=AF+LEN(AD$):R1=
RF+LEN(RD$):N1=NF+LEN(NN$):M1=MF
+LEN(MO$):W1=WF+LEN(WD$)
62070 FOR A=MM TOMM+&H16:READ D:
POKEA,D:NEXT A
62080 C1=58:C2=143:C3=255:C4=175
:CL=&H0C
62090 AC=0:SB=0:CX=1:DM=1:MI=1:W
I=3:WW=7:AA=168:DD=AA+6:IL=0:DA$
="     ":ML=5
62100 FOR I=0TO127:IX(I)=0:NEXTI
62110 IX(8)=8:IX(9)=9:IX(12)=1:I
X(10)=2:IX(65)=3:IX(68)=4:IX(82)
=5:IX(87)=6:IX(94)=7:RETURN
62120 POKE65494,0:CLS:END
62200 REM FOR 16K SYSTEMS CHANGE
LINE 60000 AND 62020: FROM &H790
0 TO &H3900
```

Education Outside The School

By Michael Plog, Ph.D.
Rainbow Contributing Editor

When most people think about education, the major image that comes to mind is the traditional school system. This includes the elementary, middle (or junior high), and high school.

There are educational settings other than traditional schools. Opportunities exist for educational use of microcomputers in these institutions — as much as in traditional schools. There has been a tremendous growth in the alternative educational settings in the past few years, and most signs indicate that the growth will continue in the next few years.

I am not talking about private, church supported schools here. In general, these schools are about the same as public schools. Oh, the students may wear a uniform (as well as the teachers), and you may find religious pictures and icons spread around the buildings. But generally, the courses taught in church supported schools are similar to those taught in the public schools.

Nor am I talking about secular private elementary and secondary schools. Again, these schools are very similar to public schools in course offerings and programs.

There are a whole host of institutions called "proprietary schools." These are institutions that offer a specialized course of study, often to adults. Some familiar examples might be real estate courses, computer training schools, business (even if no more than typing) schools, and institutions that train truck drivers. A proprietary school is operated for profit. The owners have a skill they are selling. Graduates from these institutions obtain employment based on the reputation of the school.

The microcomputer explosion has had an effect on proprietary education. I have a friend who offers a course in word processing — using microcomputers. It is possible to receive instruction (by mail order) in microcomputer repair from a proprietary school. Naturally, many places now offer courses in BASIC, just to satisfy the demand resulting from sales of microcomputers to people who have either no computer backgrounds or very limited ones.

(Michael Plog received his Ph.D. degree from the University of Illinois. In addition to his work as an educational researcher, he is a major partner in the Center for Opinion Research, a firm conducting statewide polling in Illinois. The Color Computer is used in all phases of the polling work.)

Microcomputers, and especially the Color Computer, can play a role in the proprietary schools. In addition to teaching about computers, the machines can be used for many educational purposes. For example, there is a nationwide department store chain that is considering a management course using computer assisted instruction. Simulations and specific problems could thus be presented to the trainees. In the popular real estate courses, microcomputers could be used to store data for "real life" examples for students.

For any microcomputer application in a traditional school setting, a similar application can be used in a proprietary school. Because most of the students are adults, the application may have to be altered somewhat. (I doubt that many adults would be willing to pay their own money to learn LOGO, for example.)

The range of educational institutions is much wider than proprietary schools. Almost all churches have a religious education program for children (and sometimes adults). Microcomputers can be used in such "Sunday schools" to great advantage. True, many churches may not have used microcomputers in this manner, but the possibilities are vast. While churches are beginning to get microcomputers for data management of their members, the inclusion of micros in the religious education program is a natural next step. Two national religious organizations — the Church of Christ of Latter Day Saints (Mormons) and Unitarian Universalists — have agreements with Tandy for price reductions on hardware. Other religious organizations may be in the negotiating stage (or have completed negotiating) for similar discounts.

The use of microcomputers in RE (religious education) programs may be similar to use in regular schools. We are talking about learning, which is a constant applied to all educational activities. An RE director may use a Color

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Computer to prepare simulations for students, keep track of progress of students, prepare materials, etc. It would even be possible to have some of the older students program lessons for younger ones.

This idea is not new with me; I have seen advertisements for Bible studies on computer, as well as research materials available on diskette. I am more familiar with materials for traditional Christian studies, but I assume similar materials exist for the Jewish faith and others. If they do not exist presently, it will not be long before someone creates them.

It is a rare church that does not have some of its members owning microcomputers. Many micro owners have developed (or used commercial) databases to store information about members. For those of you who have done this, I suggest you expand your horizon and talk with your RE director. You would not have to take your own microcomputer to church; you could prepare materials for the classes. Things like word find puzzles, mazes, line drawings (for coloring) could be used in the church classes.

Of course, the opportunity exists to use microcomputers for direct student interaction. Many churches own microcomputers, mostly used for business activities in the church office. Well, there is very little business going on during church school and worship service. Instead of turning off the machine, put it to educational use.

Besides these two types of educational institutions (proprietary schools and religious education), there are other organizations which include education in their purpose. Youth groups, such as scouting, are common in almost every corner of America. These groups are established for educational purposes, and can contribute greatly to the personal development of an individual. When considering education, such groups cannot be ignored; and the potential for microcomputer use among these groups is almost unlimited.

By the way, is it possible for a boy or girl scout to get a merit badge in microcomputing? I do not know, but if it is not offered now, then I suggest the scout leaders start moving on it. (Another interesting thought — the money from the sale of all that candy and cookies could be used to purchase a microcomputer.)

When considering youth groups, we should not ignore the youth component of adult service organizations. It is possible for such groups as Rotary, Lions, Junior Chamber of Commerce, Women's League to have youth attachments. Service and fraternal organizations tend to have an interest in education, and sometimes have special programs established with education as the major purpose.

The list could go on. Trade unions and organizations have youth components, and have education for members as an important component in their structure and purpose. (The concept of progression toward mastery of a craft is one of the historical purposes of trade unions and organizations.) Instead of trying to list all the possibilities, let's stop here. My space is about up anyway. Do you belong to some group that has education as one goal? If so, how is your microcomputer used with that group? Could you discuss your thoughts with the leaders of that group? If you do decide to go in this direction, I would appreciate hearing from you about it. My address is 829 Evergreen, Chatham, IL 62629.

Until next month, take care of yourself and your machine. If you are getting a big tax refund, try to spend some of it on your Color Computer. You deserve it.

16K ECB

A real money saver for the BASIC gambler

THE HOME SLOT MACHINE

By Barry Furman

Photo/Neal C. Lauron

Here's a game for those of you who love to play the slot machines, but hate to lose all those quarters! *Home Slot Machine* will entertain you, but not leave your pockets empty.

It will run on a 16K Extended Color BASIC Computer.

I feel that *Home Slot Machine* really shows off CoCo's ability to do graphics using *CHR$*.

The screen will ask if you need instructions. If you reply with "N," then the game will immediately begin; if "Y," then a set of instructions will appear. After you read the instructions, the game will automatically start.

At that point, you will be asked how many dollars (in quarters) you will be playing with. You may enter any amount you wish. Then the screen clears and a slot machine is drawn (using Color BASIC's graphics) with windows, handle, money slot and all.

At the lower right side of the screen, your "wad" will appear; i.e., the amount of money you elected to start with. This will be updated with every bet and with every win.

A prompt will then appear next to the money slot: "Pull or 1-4 quarters." This means that you may press any key to "pull the handle" to bet one quarter ([ENTER] "1" or even a joystick button are recommended) or you may press keys 2 through 4 to bet two, three, or four quarters. At this point, the value of your wad will be reduced by the amount of your bet. Winnings will double, triple or quadruple, depending on the bet.

BASIC's *SOUND* command is used liberally. You'll see and hear each quarter drop ("clunk") into the slot. You'll then hear the whirring of the wheels as you watch cherries, oranges, lemons, plums, pears, 7s, $'s, clocks, bells and bars appear to whiz past the windows. Finally, the wheels slow down and the result appears as in a real slot machine . . . one wheel stops at a time.

The status of your spin will appear on the screen ("You Lose," "Two of a Kind," etc.). Two of a Kind will pay five times your bet, Three of a Kind will pay 10 times unless three bars appear (a jackpot) for which the entire contents of the slot machine are paid out. At initialization, the machine has $500 in it.

When you win, the correct amount of quarters will "clunk" as they drop out of the machine. Your wad will be updated accordingly.

Slot Machine was designed using Color BASIC's *SET* command in *FOR-NEXT* loops (lines 260-302). The cherries, lemons, etc., are made up of character strings in *DATA* statements (510-548), and portions of these print quickly to give the appearance that they "whir" by. When they appear to slow down, the full array of character strings make the full characters (550-600).

If your machine is Color BASIC, eliminate *PRINT USING* in Line 310. A *POKE65495,0* will create an interesting speed-up, also.

Anyone who wishes a copy of the program on tape may send $5 to Barry Furman, 21 Sunset Lane, Levittown, N.Y., 11756.

Good luck playing, but play with your head, not over it!

(Barry Furman is a banking assistant vice president who works with his computer as a hobby. He plans to start his own software business.)

The listing:

234	164
262	125
308	240
348	80
402	81
456	145
494	30
534	190
566	112
END	89

```
1 ''''''''''''''''''''''''''''''''''
2 '                                '
3 '       HOME SLOT MACHINE        '
4 '                                '
5 '       BY BARRY R. FURMAN       '
6 '                                '
7 ''''''''''''''''''''''''''''''''''
```

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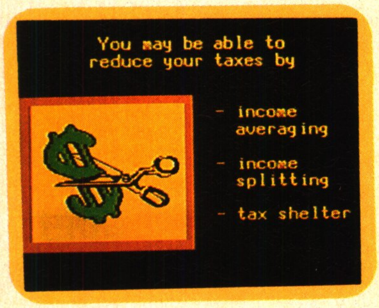
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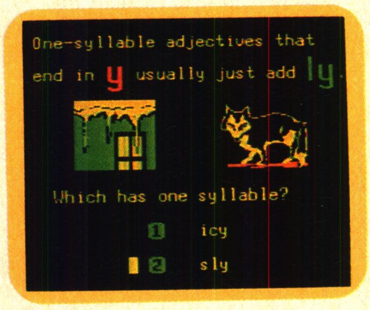
Which?
1 sister
2 smaller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Which has one syllable?
1 icy
2 sly

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```
10 DIM A(240)
100 S=500
110 DD=30 'DETERMINES SPEED OF
       COINS DROPPING.
120 B=0
200 CLS3
220 PRINT@228,"S L O T   M A C H
 I N E";
230 FORN=1TO3:GOSUB604:NEXTN
231 FORX=1TO1200:NEXT:PRINT@362,
"DO YOU NEED";:PRINT@389,"INSTRU
CTIONS (Y/N)";:INPUT INST$:IF IN
ST$="Y"THEN 232 ELSE 250
232 CLS:PRINT@3,"SLOT MACHINE IN
STRUCTIONS":PRINT@35,"**********
***************":PRINT"(1) THE S
LOT MACHINE WILL DIS-  PLAY CHER
RIES, ORANGES, LEMONS, PLUMS, PE
ARS, 7'S, $'S, CLOCKS, BELLS AND
 BARS.":PRINT"(2) THE MINIMUM BE
T IS 25 CENTS,";
233 PRINT"BUT YOU MAY BET FROM O
NE TO FOURQUARTERS IN EACH BET.
 WINNINGS WILL DOUBLE, TRIPLE OR
 QUADRUPLEDEPENDING UPON THE BET
."
234 PRINT"(3) TWO OF A KIND WILL
 PAY FIVE TIMES THE BET.  THREE
OF A KIND WILL PAY 10 TIMES THE
BET, EX-  CEPT IN THE CASE OF 3
BARS.":FORX=1TO12000:NEXT:CLS:PR
INT"THE 3 BARS REPRESENT A JACKP
OT  FOR WHICH THE ENTIRE CONTENT
S OFTHE SLOT MACHINE ARE PAID
236 PRINT"OUT. (THE MACHINE STAR
TS WITH   $500 IN IT!)":PRINT"(4
) TO BET ONE QUARTER, PRESS   TH
E <ENTER> OR <1> KEY, OR PRESSTH
E JOYSTICK BUTTON FOR REMOTE  OP
ERATION.  TO BET 2, 3, OR 4   QU
ARTERS, PRESS THE <2>, <3>, OR<4
) KEY."
238 PRINT:PRINT"         *** GOOD
LUCK! ***":FORX=1TO9000:NEXT
250 CLS3:PRINT@162,"HOW MANY DOL
LARS IN QUARTERS";:PRINT@195,"AR
E YOU PLAYING WITH";:INPUT P
252 IFP=0THENP=25
254 P=INT(P)
256 OLD=P
258 '****************************
     CREATING THE SLOT MACHINE
     ****************************
260 CLS3:PRINT@40,"SLOT MACHINE"
;
262 FORH=58TO63:FORV=0TO31
264 RESET(H,V)
266 NEXTV,H
268 PRINT@93,CHR$(143+32);
270 FORH=60TO61:FORV=4TO21
272 SET(H,V,3)
274 NEXTV,H
276 FORV=18TO21
278 SET(59,V,3):SET(62,V,3)
280 NEXTV
282 FORH=6TO17
284 FORV=6TO15
286 SET(H,V,5):SET(H+16,V,5):SET
(H+32,V,5)
```

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```
288 NEXTV,H:IFBLANK>0THENRETURN
290 FORH=22TO37:FORV=26TO29:RESE
T(H,V):NEXTV,H
292 PRINT@342,CHR$(172)+CHR$(172
);
294 PRINT@440,"YOUR WAD";:PRINT@
472,"$       ";
296 FORX=1TO1000:NEXT
298 GOSUB 606:PRINT
300 PRINT@352,"";:FORX=1TO22:PRI
NTCHR$(175);:NEXT
302 PRINT@289,"PULL/OR 1-4 QUART
ERS";:E$=INKEY$:JJ=PEEK(65280):I
FJJ=125ORJJ=253ORJJ=254ORJJ=126
ORE$<>""THEN304ELSE302
304 BET=1:IFE$="2"THEN BET=2
306 IFE$="3"THENBET=3
308 IFE$="4"THEN BET=4
309 IF BET*.25 > P THENPRINT@289
,"YOU BET TOO MUCH!!!!";:FORX=1T
O1500:NEXTX:GOTO300
310 OLD=P:P=P-.25*BET:PRINT@473,
"";:PRINTUSING"###.##";P:PRINT@3
55-66,"";:FORX=1TO22:PRINTCHR$(1
75);:NEXT
312 FORX=1TOBET:PRINT@310,"25";:
FORY=1TO400:NEXTY:PRINT@310,CHR$
(175)+CHR$(175);:PRINT@342,CHR$(
140)+CHR$(140);:FORY=1TO20:NEXTY
:SOUND238,1:PRINT@342,CHR$(172)+
CHR$(172);:FORY=1TO200:NEXTY::NE
XTX
314 FORZ=1TO520:NEXTZ
316 FORX=205TO195STEP-1:SOUNDX,1
:NEXTX
318 I=I+1
320 J=RND(10)
322 K=RND(10)
324 L=RND(10)
326 S=S+.25*BET
328 ' SPINNING THE WHEELS
330 RESTORE
332 BLANK=1 'USED TO RETURN FROM
 LINE 332
334 GOSUB282
336 FORX=1TO10
338 FORY=1TO6
340 READA(Y)
342 NEXTY
344 PRINT@179,"";
346 FORY=1TO6
348 PRINTCHR$(A(Y));
350 NEXT
352 PRINT@179,"";
354 FORY=1TO6
356 PRINTCHR$(207);
358 NEXT
360 FORY=1TO6
362 READA(Y)
364 NEXTY
366 PRINT@171,"";
368 FORY=1TO6
370 PRINTCHR$(A(Y));
372 NEXT
374 PRINT@171,"";
376 FORY=1TO6:PRINTCHR$(207);:NE
XT
378 FORY=1TO6:READA(Y)
380 NEXTY
382 PRINT@163,"";
384 FORY=1TO6
386 PRINTCHR$(A(Y));
388 NEXT
390 PRINT@163,"";
392 FORY=1TO6:PRINTCHR$(207);:NE
XT
394 NEXTX
396 IFJ=5ANDK=5ANDL=5THEN400
398 GOTO428
400 GOSUB550
402 PRINT@361,"J A C K P O T";:F
ORX=1TO20:SOUND228,2:NEXTX:FORX=
1TO200:NEXTX:PRINT@360,"";:FORX=
1TO14:PRINTCHR$(175);:NEXTX
404 V=0
406 IFCHOICE=2THENGOTO406
408 GOSUB604
410 OLD=P:P= P + S:S=250:P=P-B:B
=0
412 DD=1:GOSUB494
414 DD=30
416 GOSUB1487:GOSUB604
418 GOTO1020
420 GOSUB550
422 GOSUB 1487:GOSUB604
424 GOTO1020
426 OLD=P:P= P-B: B=0: GOTO422
428 IFJ=K ANDJ=L THEN462
430 IFJ=K ORJ=L THEN482
432 IFJ=K ORK=L THEN482
434 IFJ=L ORK=L THEN482
436 GOSUB550:GOSUB604
438 PRINT@363,"YOU LOSE";:SOUND8
0,7
439 FORX=1TO600:NEXTX:PRINT@362,
"";:FORX=1TO9:PRINTCHR$(175);:NE
XTX
440 T=T+1
442 GOSUB 606: GOSUB 604
444 IFP=<0THEN448
446 GOTO302
448 FORN=1TO5:GOSUB604:NEXTN:PRI
NT@353,"WANT TO BORROW(Y/N)?";
449 A$=INKEY$:IFA$=""THEN449
452 PRINT@352,"";:FORX=1TO26:PRI
NTCHR$(175);:NEXTX
453 IFA$="Y"THEN458
456 PRINT@362,"GAME OVER";
457 SOUND160,10:CHOICE=2:FORX=1T
O2000:NEXT:GOTO608
```

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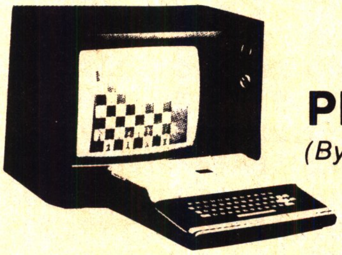

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```
458 'BORROWING:
460 OLD=P:P= P+2.5
462 GOSUB606:GOTO300
464 U=U+1
466 PRINT@359,"THREE OF A KIND";
:FORX=180TO232 STEP2:SOUNDX,1:NE
XTX:PRINT@358,"";:FORX=1TO16:PRI
NTCHR$(175);:NEXTX
468 GOSUB604
470 S=S-2.5*BET:OLD=P:P=P+2.5*BE
T
472 DD=15:GOSUB494
474 DD=30
476 IF P - B > 2.5*BET THEN480
478 GOSUB606:GOTO300
480 OLD=P:P=P-B:B=0:GOTO478
482 OLD=P:P= P+1.25*BET:S=S-1.25
*BET
484 GOSUB550:GOSUB604
486 VV=VV+1
488 PRINT@361,"TWO OF A KIND";
490 FORX=189TO213STEP2:SOUNDX,1:
NEXTX:GOSUB494
492 GOTO502
494 IF P-OLD>10THEN OLD= P-10 EL
SE FORX=1TO(P-OLD)*4:PRINT@430,"
25";:FORY=1TO DD:NEXTY:PRINT@430
,CHR$(128);:PRINT@431,CHR$(128);
:PRINT@462,"25";:FORY=1TO DD:NEX
TY:PRINT@462,CHR$(128);:PRINT@46
3,CHR$(128);
496 PRINT@494,"25";:FORY=1TODD:N
EXTY:PRINT@494,CHR$(175);:PRINT@
495,CHR$(175);
498 SOUND228,1:FORZ=1TO120:NEXTZ
:NEXTX
500 RETURN
502 GOSUB606:GOSUB604
504 IF P - B >2.5*BET THEN508
506 GOTO300
508 OLD=P:P=P-B:B=0:GOTO300
510 'DATA"  BELL  "
512 DATA207,206,128,128,205,207,
207,128,128,128,128,207,207,195,
194,195,195,207
514 'DATA FOR CHERRY:
516 DATA207,207,205,207,207,207,
207,191,191,191,191,207,207,191,
191,191,191,207
518 'DATA FOR "$":
520 DATA207,207,200,200,204,207,
207,203,200,200,205,207,207,206,
200,200,201,207
522 'DATA" ORANGE "
524 DATA207,207,207,205,207,207,
207,255,255,255,255,207,207,255,
255,255,255,207
526 'DATA FOR JACKPOT (BAR):
528 DATA207,207,207,207,207,207,
128,98,97,114,128,128,207,207,20
7,207,207,207
530 'DATA"  PEAR  "
532 DATA207,207,206,207,207,207,
207,207,143,143,207,207,207,143,
143,143,143,207
534 'DATA FOR CLOCK:
536 DATA 202,195,195,195,195,197
,202,207,204,197,207,197,202,204
,204,204,204,197
538 'DATA"  PLUM  "
540 DATA207,207,206,207,207,207,
207,239,239,239,207,207,207,239,
239,239,207,207
542 'DATA FOR "7":
544 DATA207,195,195,194,207,207,
207,207,206,199,207,207,207,206,
199,207,207,207
546 'DATA"  LEMON "
548 DATA207,207,207,205,207,207,
207,207,159,159,159,207,207,207,
159,159,159,207
550 RESTORE
552 FORN=1TOL
554 FORX=1TO3
556 FORY=1TO6
558 READA
560 IFY=1THENPRINT@115+X*32,"";
562 PRINTCHR$(A);
564 NEXTY:NEXTX
566 NEXTN:RESTORE
568 SOUND215,1
570 FORN=1TOK
572 FORX=1TO3:FORY=1TO6:READA
574 IFY=1THENPRINT@107+X*32,"";
576 PRINT CHR$(A);
578 NEXTY,X
580 NEXTN:RESTORE
582 SOUND220,1
584 FORN= 1 TO J
586 FORX=1TO3:FORY=1TO6
588 READA
590 IFY=1THENPRINT@99+X*32,"";
592 PRINT CHR$(A);
594 NEXTY,X
596 NEXTN:RESTORE
598 SOUND225,1
600 FORX=1TO300:NEXT
602 RETURN
604 FORZ=1TO500:NEXTZ:RETURN
606 IFWAD>999.99THEN456ELSEPRINT
@473,"";:PRINTUSING"###.##";P;
608 IF CHOICE=2THENCLS:PRINT"HER
E'S HOW YOU DID:":PRINT:PRINT"NO
  OF TRIES:";I:PRINT"LOSSES:
  ";T:PRINT"3 OF A KIND: ";U:PRI
NT"2 OF A KIND: ";VV:END
610 FORYY= 1TO1800:NEXTYY
612 IFP=0THEN448
614 RETURN
```

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1. EDUCATIONAL #1

These even run on Non-Extended CoCos - **Words** (unscramble the words), **Spell-It** (spelling helper), **Learn Notes** (with graphic piano keys), **Sorts** (explained and demonstrated), **Base Guess** (game to learn other number bases), **Morse Quiz** (learn Morse Code), and **Equations** (solves systems of equations).

2. EDUCATIONAL #2

Only for Extended Basic - **Mathvaders** (shoot the right answer), **Scrambler** (put lists in order), **Language Drill** (help with foreign word lists), **Factors** (factoring game), **Typing Tutor**, **Manybody** (demostrates gravitational forces), **Maximum** (pick the largest number game), **Chemlab** (simulated experiments), and **How Far** (places and distances).

3. UTILITIES #1

Programming is simpler when you use **Lister**, **Listmod**, **Newtrace** (a better TRON), **Lazkey** (define keys as phrases), **Append** (easily combine two BASIC programs), **BASIC Map**, **Varmap**, **Deleter**, and **CK Monitor** (look at and modify memory).

4. DISK UTILITIES #1

Harness the hidden powers of your disk system with **Disk Edit** (change things on disk directly), **Disk Aid**, **Offset** (EXECs most tape-only programs), **Track Lock**, **DIR Save/Get** (foil I/O errors), **Cataloger**, **Master Catalog** (keep track of your program library), and **File Copy** (a better BACKUP).

5. GAMES #1

Action-packed, logical, and colorful ones! **Flyby** (shoot ducks, planes, and faces), **Blackjack**, **Motorcycle**, **Germ** (stop the waves of nasties), **Blockade**, **Life**, **Diggem**, **Robot Run**, **Stellar Empire** (control the heavens - 1 to 4 players), and **Zero G** for your fun and pleasure!

6. ADVENTURES #1

Trips to far-off and dangerous places. On the agenda are **Jerusalem Adventure**, **Ultimate Adventure**, **Williamsburg Adventure**, **House Adventure**, **Andrea Doria Adventure**, **Blackard's Castle** (1500 rooms), and **Realm of Nauga** (in real-time)!

7. PRACTICALS #1

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For data manipulation and display! Do it with **Pie Chart**, **Bar Chart**, **XY Graph**, **Curve Fit** (predict trends), and **Two Dates** (see monthly calendars for any two dates).

9. GRAPHICS #1

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10. NON-EXTENDED #1

Five Standard BASIC programs including **House Adventure** (find twenty objects or die), **Stellar Empire** (a 2 to 4 person strategy game), **Tape Inventory** (keep track of your tapes), **Space Ace** (shoot'em-up), and **Lazkey** (define keys as words or phrases).

11. NON-EXTENDED #2

Five more Standard BASIC programs including **Williamsburg Adventure** (a humorous one), **Two Dates** (show monthly calendars), **Box Shoot** (two-player face-off), **Flyby** (shoot ducks, faces, and planes), and **Deleter** (delete needless REM's and spaces from programs).

(Extended BASIC required unless noted)

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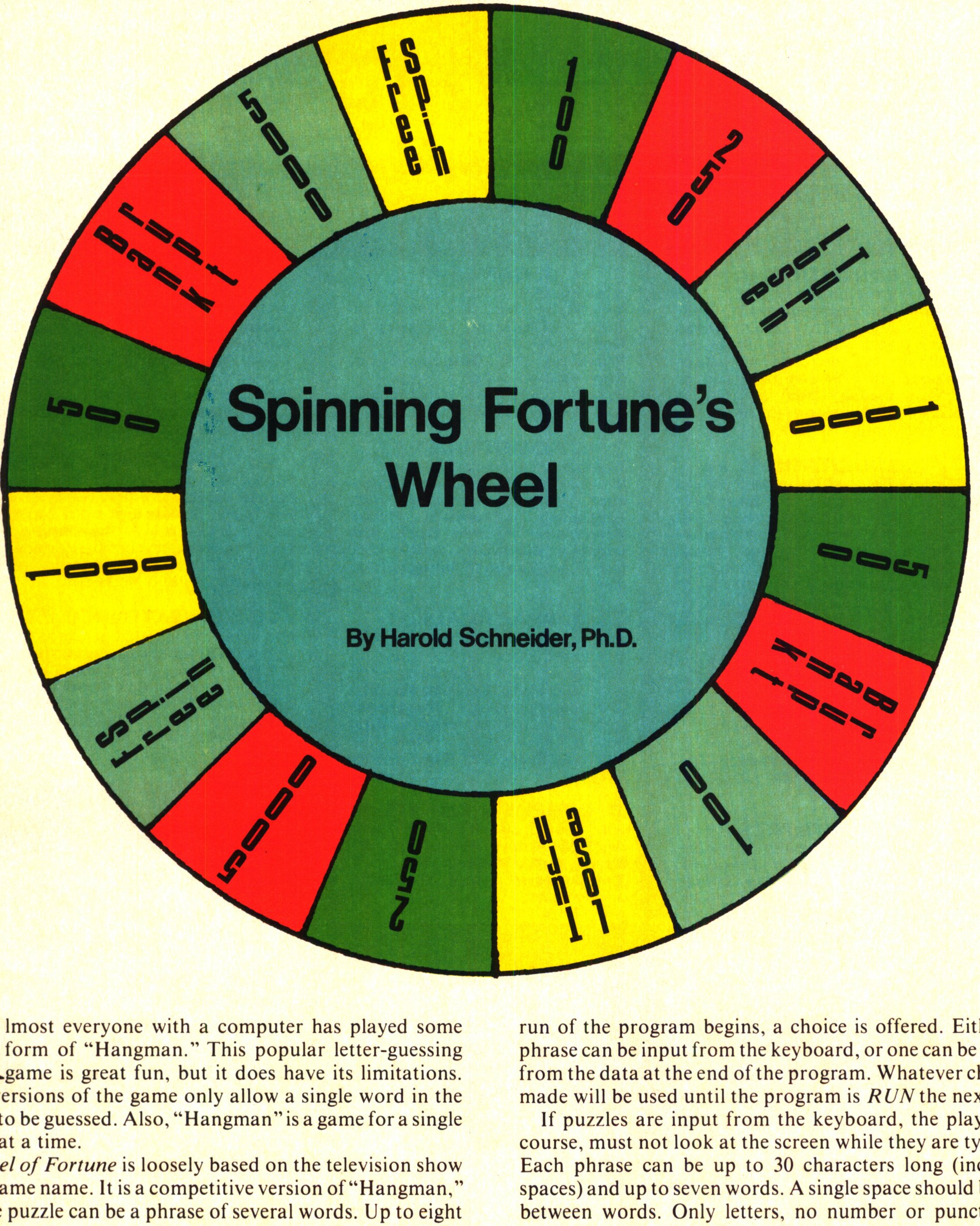


Spinning Fortune's Wheel

By Harold Schneider, Ph.D.

Almost everyone with a computer has played some form of "Hangman." This popular letter-guessing game is great fun, but it does have its limitations. Most versions of the game only allow a single word in the puzzle to be guessed. Also, "Hangman" is a game for a single player at a time.

Wheel of Fortune is loosely based on the television show of the same name. It is a competitive version of "Hangman," and the puzzle can be a phrase of several words. Up to eight people can play at once, but three or four players make the best game. It can be played by one player alone, but since no limit on the number of guesses is provided, some limit should be used.

The Game

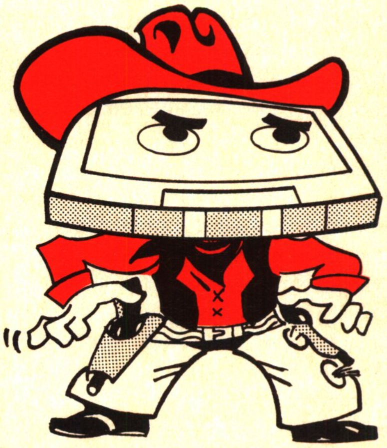
First, the computer prompts you for the number of players and their names. Before playing a round of the game, a phrase must be chosen as the puzzle to be guessed. When the run of the program begins, a choice is offered. Either the phrase can be input from the keyboard, or one can be chosen from the data at the end of the program. Whatever choice is made will be used until the program is *RUN* the next time.

If puzzles are input from the keyboard, the players, of course, must not look at the screen while they are typed in. Each phrase can be up to 30 characters long (including spaces) and up to seven words. A single space should be used between words. Only letters, no number or punctuation marks, may be used. There must be at least one consonant, since otherwise the puzzle can never be guessed.

A category describing the phrase must also be given as a clue. The allowed categories are: Title, Fictional Character, Person, Event, Place and Thing.

After the puzzle has been chosen, the screen clears and the category and dashes for each letter of the phrase are displayed. Each word is displayed on a separate line.

Chromasette
vs.
the other guy



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Chromasette

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Lines 60–100 get the player names and determine whether phrases will be input from the keyboard or read from data. Keyboard input is handled in lines 110–150, and data is read by the subroutine in lines 210–230. Lines 240–270 break the phrase up into words and characters, and set up the display array.

Lines 170–190 call the subroutines that comprise each player's turn. The subroutine in 290–330 checks the guess of a letter. Lines 340–380 show the phrase if it is not guessed. Line 390 handles the spin of "Bankrupt," line 400 "Lose Turn," line 430 "Free Spin," and lines 410–420 offer another spin if a player has a free spin from an earlier spin. Lines 440–630 handle the spin of a money amount. These lines include getting a letter guess, reporting the result, giving the resulting menu, checking guesses of the puzzle, and buying a vowel.

Lines 650–660 pass the turn to the next player. If no consonants are left to be guessed, lines 710–770 give each player one chance to guess the puzzle. The wheel is spun in lines 820–890. Lines 910–970 handle the end of a round. Line 980 determines screen color. Lines 1030–1050 display the blanks and correctly-guessed letters of the puzzle, while 1070–1080 display any incorrect guesses. Lines 1090–1120 take care of *INKEY$* input.

Customizing The Program

The *DATA* statements in lines 1140–1230 consist of 100 pairs of phrases and category numbers. The ones included are ones appropriate for my family. You can customize the program by replacing them with ones more appropriate to your audience.

The program can serve as an educational tool. Simply choose phrases appropriate to the subject being taught. You don't need 100 phrases. Any number 20 or greater can be used. The new number of phrases must replace the "100" in line 210. If fewer than 20 phrases are to be used, change line 210 and change the "20" in line 930 to the new number of phrases. The categories in line 50 can also be changed.

If you want only input from *DATA* statements, change line 100 to:

```
100 CC=2:GOSUB 210:GOTO 170
```

and delete lines 90 and 110–150. If you only want phrases input from the keyboard, change line 100 to:

```
100 CC=1
```

and delete lines 90 and 200–230.

		760	118
100	53	930	152
200	195	1040	176
320	240	1160	122
430	241	1200	238
610	6	END	115

The listing:

```
10 'WHEEL OF FORTUNE BY HAROLD S
CHNEIDER
20 CLS RND(7)+1:PRINT@173,"WHEEL
";:PRINT@238,"OF";:PRINT@300,"FO
RTUNE";:CLEAR 500
30 DIM WH$(20),A$(40),H$(40),PL$
(8),PM(8),PS(8),C$(6),P$(10),FT(
8),BL$(8),U(20),ZG$(25)
40 FOR I=1 TO 20:READ WH$(I):NEX
T I:RESTORE:VV=1:ZW=0:TN=0:GOSUB
 1000
50 C$(1)="TITLE":C$(2)="FICTIONA
L CHARACTER":C$(3)="PERSON":C$(4
)="EVENT":C$(5)="PLACE":C$(6)="T
HING"
60 CLS RND(7)+1:PRINT" NOW WE AR
E GOING TO PLAY 'WHEELOF FORTUNE
'.  HOW MANY PEOPLE   ARE PLAYIN
G?  ";
70 GOSUB 1090:NP=A:PN=RND(NP):IF
 NP<1 OR NP>8 THEN PRINT:PRINT"
 I'M SORRY, ONLY 1 TO 8 PLAYERSC
AN PLAY.":PRINT"HOW MANY PLAYERS
?":GOTO 70
80 FOR I=1 TO NP:PRINT"WHAT IS T
HE NAME OF PLAYER #"I;:INPUT PL$
(I):NEXT
90 PRINT"  EITHER THE COMPUTER C
AN CHOOSETHE PHRASE WHICH YOU HA
VE TO    GUESS, OR SOMEONE WHO I
S NOT    PLAYING CAN  CHOOSE IT.
":PRINT"DO YOU WANT THE COMPUTER
 TO      CHOOSE IT?";:GOSUB 1110
100 IF B$="Y" THEN CC=2:GOSUB 21
0:GOTO 170 ELSE CC=1
110 CLS RND(7)+1:PRINT"  ANYONE
WHO IS GOING TO PLAY   THE GAME
SHOULD NOT LOOK AT THE SCREEN."
120 PRINT"  ENTER A WORD OR PHRA
SE, CHOSENIN ONE OF THE FOLLOWIN
G         CATEGORIES:":FOR I=1 T
O 6:PRINTI"."C$(I):NEXT I
130 PRINT"  DO NOT USE ANY PUNCT
UATION    MARKS OR NUMERALS.":IN
PUT "  WHAT IS YOUR PHRASE";S$:W
$=S$:IF LEN(S$)>30 THEN CLS:PRIN
T"YOUR PHRASE IS TOO LONG.":GOTO
 120
140 PRINT"WHAT IS THEN NUMBER OF
 THE       CATEGORY THIS IS IN?";
:GOSUB 1090:CN=A:IF CN<1 OR CN>6
 THEN PRINT:PRINT"  YOUR CATEGOR
Y MUST HAVE NUMBERFROM 1 TO 6.":
FOR I=1 TO 6:PRINT I"."C$(I):NEX
T I:GOTO 140
150 GOSUB 240
160 'TAKE TURN
170 GOSUB 1030:PRINT@352,"IT IS
"PL$(PN)"'S TURN.";:PRINT@384,"H
IT ANY KEY TO SPIN";:PRINT@416,"
THE WHEEL.";:A$=INKEY$
180 A$=INKEY$:A=RND(0):IF A$=""T
HEN 180
190 GOSUB 820:GOSUB 980:PRINT@35
2,BL$(CO);:PRINT@384,BL$(CO);:PR
INT@416,BL$(CO);:ON RX GOTO 390,
400,430,440
```

Lines 60–100 get the player names and determine whether phrases will be input from the keyboard or read from data. Keyboard input is handled in lines 110–150, and data is read by the subroutine in lines 210–230. Lines 240–270 break the phrase up into words and characters, and set up the display array.

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(I):NEXT
90 PRINT"  EITHER THE COMPUTER C
AN CHOOSETHE PHRASE WHICH YOU HA
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 TO      CHOOSE IT?";:GOSUB 1110
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0:GOTO 170 ELSE CC=1
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SHOULD NOT LOOK AT THE SCREEN."
120 PRINT"  ENTER A WORD OR PHRA
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O 6:PRINTI"."C$(I):NEXT I
130 PRINT"  DO NOT USE ANY PUNCT
UATION    MARKS OR NUMERALS.":IN
PUT "  WHAT IS YOUR PHRASE";S$:W
$=S$:IF LEN(S$)>30 THEN CLS:PRIN
T"YOUR PHRASE IS TOO LONG.":GOTO
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T I:GOTO 140
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170 GOSUB 1030:PRINT@352,"IT IS
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THE WHEEL.";:A$=INKEY$
180 A$=INKEY$:A=RND(0):IF A$=""T
HEN 180
190 GOSUB 820:GOSUB 980:PRINT@35
2,BL$(CO);:PRINT@384,BL$(CO);:PR
INT@416,BL$(CO);:ON RX GOTO 390,
400,430,440
```

```
200 'CHOOSE PHRASE
210 TN=TN+1:RESTORE:FOR I=1TO 20
:READ A$:NEXT:W$="":N=RND(100)
220 FOR J=1 TO TN-1:IF U(J)=N TH
EN TN=TN-1:GOTO210 ELSE NEXT J:U
(TN)=N
230 FOR I=1 TO N:READ S$,CN:NEXT
:W$=S$
240 NV=0:TL=LEN(W$):SP=0:FOR I=1
 TO 30:A$(I)="":NEXT
250 FOR I=1 TO TL:A$(I)=MID$(W$,
I,1):IF A$(I)=" "THEN SP=SP+1:SL
(SP)=I ELSE IF A$(I)="A" OR A$(I
)="E" OR A$(I)="I" OR A$(I)="O"
OR A$(I)="U" THEN NV=NV+1
260 NEXT I:SL(0)=0:SL(SP+1)=TL+1
:W$="":FOR I=1 TO 7:P$(I)="":NEX
T I:FOR I=0 TO 7:P$(I)="":FOR J=
SL(I)+1 TO SL(I+1)-1:P$(I)=P$(I)
+A$(J):NEXT J,I:FOR I=0 TO SP+1:
W$=W$+P$(I):NEXT I
270 NL=LEN(W$):FOR I=1 TO NL:A$(
I)=MID$(W$,I,1):H$(I)="-":NEXT I
:C=0:RETURN
280 'CHECK GUESS
290 IF ASC(LG$)>64 AND ASC(LG$)<
91 THEN 310 ELSE PRINT@0,BL$(CO)
;:PRINT@2,"LETTERS ONLY!!";:PRIN
T@480,"WHAT IS YOUR GUESS?";:LG$
=INKEY$
```

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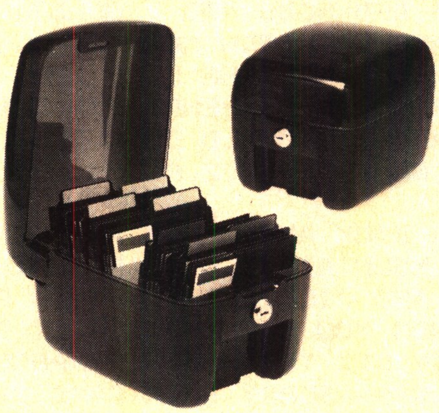
```
300 LG$=INKEY$:IF LG$="" THEN 30
0 ELSE 290
310 PRINT@448,BL$;:IF VV=0 THEN
320 ELSE IF LG$="A" OR LG$="E" O
R LG$="I" OR LG$="O" OR LG$="U"
THEN PRINT@416,"NO VOWELS!";:LG$
=".":GOTO 290
320 D=0:FOR I=1 TO NL:IF A$(I)=L
G$ AND H$(I)<>LG$ THEN C=C+VV:H$
(I)=A$(I):SOUND 170,8 ELSE D=D+1
330 NEXT I:GOSUB 1030:RETURN
340 FOR I=1 TO NL
350 H$(I)=A$(I)
360 NEXT I
370 GOSUB 1030
380 RETURN
390 PRINT@352,"YOU ARE BANKRUPT!
";:SOUND 20,5:SOUND 1,15:PM(PN)=
0:FT(PN)=0:GOSUB 780:GOTO 650
400 PRINT@352,"YOU LOSE YOUR TUR
N!";:SOUND 20,5:SOUND 1,15:IF FT
(PN)=0 THEN GOSUB 780:GOTO 650
410 PRINT@384,"YOU HAVE"FT(PN)"F
REE TURN";:IF FT(PN)=1 THEN PRIN
T".";:ELSE PRINT"S.";
420 PRINT@416,"DO YOU WANT TO SP
IN";:PRINT@448,"AGAIN?";:GOSUB 1
110:IF B$="Y" THEN FT(PN)=FT(PN)
-1:GOTO 680 ELSE 650
430 PRINT@352,"YOU WIN A FREE SP
IN!";:SOUND 170,8:FT(PN)=FT(PN)+
1:GOSUB 780:PRINT@480,BL$(CO);:P
RINT@483,BL$(CO);:GOTO 190
440 PRINT@352,"GUESS A LETTER.";
:GOSUB 1070:LG$=INKEY$
450 LG$=INKEY$:IF LG$=""THEN450
ELSE IF LG$="A" OR LG$="E" OR LG
$="I" OR LG$="O" OR LG$="U" THEN
 PRINT@384,"DO NOT GUESS A VOWEL
.";:GOTO 450
460 GOSUB 290:IF D=NL THEN PRINT
@352,"THERE ARE NO "LG$"'S.";:SO
UND 20,5:SOUND 1,15:ZW=ZW+1:ZG$(
ZW)=LG$:IF FT(PN)>0 THEN 410 ELS
E GOSUB 780:GOTO 650
470 X=WH*(NL-D):PRINT@352,"YOU W
IN $"X".";:PM(PN)=PM(PN)+X:PRINT
@384,"YOU NOW HAVE $"PM(PN)".";
480 GOSUB 780:GOSUB 1030:IF NL-C
<=NV THEN 710
490 PRINT@352,"DO YOU WANT TO:";
:PRINT@384,"   1. GUESS THE ANSW
ER.";:PRINT@416,"   2. BUY A VOW
EL.     ";:PRINT@448,"   3. SPIN
 AGAIN.     ?";:GOSUB 1090
500 IF A<1 OR A>3 THEN PRINT@320
,"CHOOSE A NUMBER FROM 1 TO 3.":
GOTO 490
510 ON A GOTO 520,540,670
520 GOSUB 1030:PRINT@352,"WHAT I
```

```
S YOUR GUESS";:INPUT GS$:IF GS$=
S$ THEN 910
530 PRINT@416,"I'M SORRY, BUT YO
UR ANSWER IS   INCORRECT.":GOSUB
 780:GOTO 650
540 GOSUB 1030:IF PM(PN)<250 THE
N PRINT@320,"YOU DO NOT HAVE ENO
UGH MONEY TO BUY A VOWEL.":GOTO
610
550 PRINT@320,"A VOWEL COSTS $25
0.":PM(PN)=PM(PN)-250:PRINT"YOU
HAVE $"PM(PN)"LEFT."
560 PRINT@384,"WHAT VOWEL DO YOU
 WANT TO BUY?";:LG$=INKEY$
570 LG$=INKEY$:IF LG$=""THEN 570
580 IF LG$<>"A" AND LG$<>"E" AND
 LG$<>"I" AND LG$<>"O" AND LG$<>
"U" THEN GOSUB 1030:PRINT@320,"Y
OU MUST CHOOSE A,E,I,O,OR U.":GO
TO 560
590 IF ASC(LG$)<65 OR ASC(LG$)>9
0 THEN GOSUB 1030:PRINT@3,BL$(CO
);:PRINT@3,"LETTERS ONLY!!";:PRI
NT@480"WHAT IS YOUR GUESS?";:GOT
O 570
600 VV=0:GOSUB 290:VV=1
610 PRINT@384,"DO YOU WANT TO:";
:PRINT@416,"  1. GUESS THE ANSWE
R.";:PRINT@448,"  2. SPIN AGAIN.
      ?";:GOSUB 1090
620 IF A<1 OR A>2 THEN GOSUB 102
0:PRINT@320"PLEASE ANSWER 1 OR 2
.":GOTO 610
630 ON A GOTO 520,680
640 'NEXT PLAYER
650 PN=PN+1:IF PN>NP THEN PN=1
660 GOTO 170
670 'SPIN AGAIN
680 GOSUB 1030:PRINT@352,"HIT AN
Y KEY TO";:PRINT@384,"SPIN THE W
HEEL!";
690 GOTO 180
700 'NO MORE CONSONANTS
710 D=0:FOR II=1 TO NL:IF H$(II)
="-"THEN D=1
720 NEXT II:IF D=0 THEN 910
730 PRINT@320,"THERE ARE NO MORE
 CONSONANTS IN THE PUZZLE. EACH
PLAYER WILL NOWGET ONE CHANCE TO
 GUESS THE     ANSWER. "PL$(PN)"
 GOES FIRST.":INPUT"  WHAT IS YO
UR GUESS";GS$:IF GS$=S$ THEN 910
740 IF NP=1 THEN 760 ELSE FOR II
=1 TO NP-1:A=PN+II:IF PN+II>NP T
HEN A=A-NP
750 GOSUB 1030:PRINT@320,"IT IS
NOW "PL$(A)"'S":PRINT"TURN TO GU
ESS.":INPUT"WHAT IS YOUR GUESS";
GS$:IF GS$=S$ THEN PN=A:GOTO 910
 ELSE NEXT II
760 GOSUB 340
770 PRINT@2,"THE ANSWER WAS:";:F
OR I=1 TO NP:PM(I)=0:NEXT I:GOTO
 930
780 PRINT@480,"HIT ANY KEY TO CO
NTINUE.";:A$=INKEY$
790 A$=INKEY$:A=RND(0):IF A$=""
THEN 790 ELSE RETURN
810 'SPIN WHEEL
820 PRINT@244,"=>";:ST=K-14:IF S
T<1 THEN ST=ST+20
830 FOR I=-1+ST TO ST+6+RND(20):
SOUND 200,2:FOR J=1 TO 15:K=J+I
840 IF K>20 THEN K=K-20:GOTO 840
850 PRINT@22+(J-1)*32,WH$(K):NEX
T J,I
860 IF K<8 THEN K=K+20
870 WH$=WH$(K-7)
880 IF WH$="BANKRUPT" THEN RX=1:
RETURN:ELSE IF WH$="LOSE TURN"TH
EN RX=2:RETURN ELSE IF WH$="FREE
 SPIN"THEN RX=3:RETURN:ELSE RX=4
890 WH=VAL(RIGHT$(WH$,3)):RETURN
900 'WINNER!
910 FOR I=0 TO 8:CLS I:SOUND 170
,6:NEXT I:CLS RND(9)-1:IF PM(PN)
<100 THEN PM(PN)=100
920 PRINT@169,"YOU'RE RIGHT!!!";
:PRINT@264,"YOU WIN $"PM(PN)"!";
:PS(PN)=PS(PN)+PM(PN):FOR I=1 TO
```



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```
 NP:PM(I)=0:NEXT I
930 IF TN>=20 THEN B$="N" ELSE P
RINT@388,"DO YOU WANT TO CONTINU
E?";:GOSUB 1110
940 CLS RND(9)-1:PRINT@200,"SCOR
ES:";:FOR I=1 TO NP:PRINT@202+32
*I,PL$(I);TAB(23)"$"PS(I);:NEXT
I
950 GOSUB780:CLS RND(9)-1:IF B$<
>"Y" THEN END
960 ZW=0:VV=1:PN=PN+1:IF PN>NP T
HEN PN=1
970 CLS RND(7)+1:IF CC=2 THEN GO
SUB 210:GOTO 170 ELSE 110
980 CO=ABS(POINT(60,31)):RETURN
990 'SET ERASING CHARACTERS
1000 BL$(0)=CHR$(128):FOR I=1TO2
1:BL$(0)=BL$(0)+CHR$(128):NEXT I
1010 FOR CO=1TO8:BL$(CO)=CHR$(12
7+16*CO):FOR I=1TO21:BL$(CO)=BL$
(CO)+CHR$(127+16*CO):NEXT I:NEXT
 CO:RETURN
1020 'DISPLAY PHRASE SUBROUTINE
1030 FOR I=0 TO 7:D$(I)="":NEXT
I:FOR I=1 TO LEN(P$(0)):D$(0)=D$
(0)+H$(I):NEXT I:IF SP=0 THEN 10
50
1040 LG=LEN(P$(0)):FOR J=1 TO SP
:FOR I=LG+1 TO LG+LEN(P$(J)):D$(
J)=D$(J)+H$(I):NEXT I:LG=LG+LEN(
P$(J)):NEXT J
1050 CLS RND(7)+1:PRINT@2,C$(CN)
;:FOR I=0 TO SP:PRINT@65+32*I,D$
(I);:NEXT I:RETURN
1060 'DISPLAY WRONG GUESSES
1070 IF ZW=0 THEN RETURN ELSE PR
INT@416,"INCORRECT GUESSES:";:PR
INT@448,"";:FOR ZI=1 TO ZW:PRINT
 ZG$(ZI);:IF ZI<>ZW THEN PRINT",
";
1080 NEXT ZI:RETURN
1090 A$=INKEY$
1100 A$=INKEY$:IF A$="" THEN 110
0 ELSE A=VAL(A$):RETURN
1110 B$=INKEY$
1120 B$=INKEY$:IF B$<>"Y" AND B$
<>"N" THEN 1120 ELSE RETURN
1130 DATA $150,$200,$300,LOSE TU
RN,$300,$500,$150,FREE SPIN,$100
,$250,$400,BANKRUPT,$500,$100,$2
00,LOSE TURN,$400,$100,$350,FREE
 SPIN
1140 DATA ALICE IN WONDERLAND,1,
WHEEL OF FORTUNE,1,DIFFERENT STR
OKES,1,ALL IN THE FAMILY,1,HAPPY
 DAYS,1,THE SWORD IN THE STONE,1
,THE FOX AND THE HOUND,1,MY FAIR
 LADY,1,THE MUSIC MAN,1,FAMILY F
EUD,1
1150 DATA MARY POPPINS,2,MICKEY
MOUSE,2,OLIVER TWIST,2,LITTLE OR
PHAN ANNIE,2,DENNIS THE MENACE,2
,DICK TRACY,2,DADDY WARBUCKS,2,D
OCTOR DOLITTLE,2,CLARK KENT,2,SN
OW WHITE,2
1160 DATA WALT DISNEY,3,MARK TWA
IN,3,QUEEN ELIZABETH,3,ANN LANDE
RS,3,JOHNNY CARSON,3,BOB HOPE,3,
JOHN PAUL JONES,3,ADAM AND EVE,3
,BENJAMIN FRANKLIN,3,RONALD REAG
AN,3
1170 DATA SINGING A SONG,4,PRESI
DENTIAL ELECTION,4,DISCOVERY OF
AMERICA,4,CALIFORNIA GOLD RUSH,4
,COLLEGE GRADUATION,4,SPELLING B
EE,4,RECEIVING THE TEN COMMANDME
NTS,4,INVENTING THE TELEPHONE,4,
FALLING ASLEEP,4,GOING TO SCHOOL
,4
1180 DATA NEW YORK CITY,5,UNITED
 STATES OF AMERICA,5,STATE OF IL
LINOIS,5,WALT DISNEY WORLD,5,THE
 ENGLISH CHANNEL,5,CITY OF CHICA
GO,5,ATLANTIC OCEAN,5,MOUNT RUSH
MORE,5,SMITHSONIAN INSTITUTION,5
,YELLOWSTONE NATIONAL PARK,5
1190 DATA PHONOGRAPH RECORD,6,CO
LOR COMPUTER,6,TELEVISION SET,6,
BARBIE DOLL,6,THEATER TICKET,6,L
IGHTNING BUG,6,MAGAZINE SUBSCRIP
TION,6,DECK OF CARDS,6,LIBRARY B
OOK,6,AIRPLANE TICKET,6
1200 DATA HUCKLEBERRY FINN,2,WOO
DY WOODPECKER,2,ANNE FRANK,3,THE
 THREE MUSKETEERS,1,THE PRINCE
AND THE PAUPER,1,SCOOBY DOO,2,SO
NG OF THE SOUTH,1,SEWING BASKET,
6,THE PHANTOM TOLLBOOTH,1,THE TH
REE LITTLE PIGS,2
1210 DATA COUNT DRACULA,2,MOTHER
 GOOSE,2,LITTLE RED RIDING HOOD,
2,HANS CHRISTIAN ANDERSON,3,THOM
AS ELVA EDISON,3,GEORGE WASHINGT
ON,3,PAUL REVERE,3,CHRISTOPHER C
OLUMBUS,3,CHARLIE BROWN,2,BEETLE
 BAILEY,2
1220 DATA BEDKNOBS AND BROOMSTIC
KS,1,ESCAPE TO WITCH MOUNTAIN,1,
HAUNTED MANSION,5,THE LOVE BUG,1
,SING A SONG OF SIXPENCE,1,A CHR
ISTMAS CAROL,1,DONALD DUCK,2,HAL
LOWEEN,4,NANCY DREW,2,PECOS BILL
,2
1230 DATA JACK AND THE BEANSTALK
,1,SPACE MOUNTAIN,5,NIAGARA FALL
S,5,JACK AND JILL,1,THE WIZARD O
F OZ,1,WHEN YOU WISH UPON A STAR
,1,SEVENTY SIX TROMBONES,1,RAGGE
DY ANN,2,STRAWBERRY SHORTCAKE,2,
ICE CREAM CONE,6
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97,000	Bernard Parent, Ste-Foy, Quebec
92,000	Harry Sawyer, Watchung, NJ
18,000	Michel Hengartner, Ste-Foy, Quebec
3,375	Kevin Zacks, Houston, TX

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BERSERK *(Mark Data)*

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693,683	Matt Bondelier, Perrysburg, OH
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459,458	Janice Elkes, Toledo, OH
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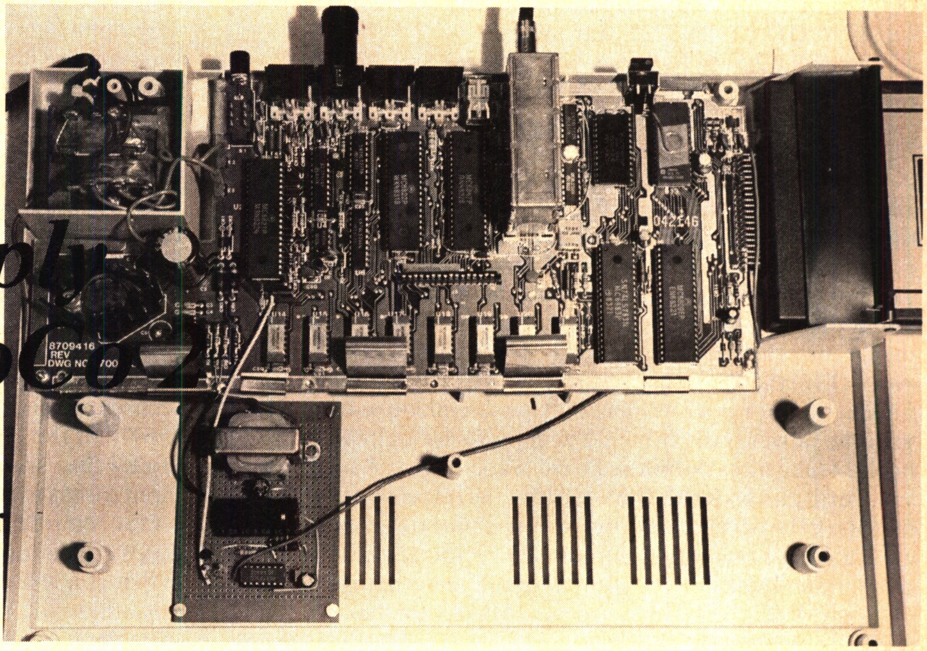
TURN OF THE SCREW

A 12-Volt Power Supply For The CoCo 2



By Tony DiStefano
***Rainbow* Contributing Editor**

When Radio Shack came out with the CoCo 2, they made it as close as possible to the old Color Computer as they could. Nevertheless, there are some minor differences. First of all, the physical size of the case is different. It is a lot smaller. All the other differences are not very obvious. You cannot see them from the outside and most are invisible to the user. That means that even though they are different, it will function the same. For example: The RS-232 circuit is completely different, different ICs are used, they are placed in a different part of the computer. But, when you use the RS-232, it will work with all the old software. Another difference is the RF modulator. It is a completely different modulator. The circuit is all changed, yet it works. So what is all this coming to? Why am I telling you all this if it is all the same? There is one change Radio Shack did that will affect the user. It is in the power supply.

In the Color Computer, there are four voltages coming from the power supply. Five volts, 12 volts, -5 volts, and -12 volts. In the CoCo 2 there is just one voltage. That is 5 volts. A small negative voltage is produced on board for the RS-232, which requires negative voltage to work. It does not have 12 volts. Most people would say, "So what!" Well, if you don't have a disk system or a graphics tablet, you wouldn't know the difference. But, if you have the old Radio Shack controller (the ones sold with the gray drives) or a graphics tablet, you will find that neither of them work with your CoCo 2. Why? This is where the 12 volts come in. Both of these accessories (and probably many more) need 12 volts to function. The CoCo 2 does not have 12 volts. One way to solve this problem is to get the Multi-Pak Interface from Radio Shack. Not a bad idea, it has the 12 volts and is quite handy if you have many things to plug into it. On the other hand, it is expensive if all you have is a disk drive. Well, there is another solution, build a small 12 volt power supply. I'll show you how.

This power supply is small enough that it will fit under the keyboard of the CoCo 2. The IC that I used can supply up to 150 milliamps or .15 amps. The reference manual for the regular Color Computer says that the 12 volts can supply up to 300 milliamps. I don't think that you need that much current, seeing that the Radio Shack controller needs only about 25 milliamps. Another reason that I used this chip is that it has the capability of shutdown. This means that under certain circumstances the IC will stop to output voltage. This is very important when you want to turn the CoCo 2 off. At first I thought of just adding a switch. But then that would mean that every time you wanted to turn the computer on, you would have to first turn on the 12 volt switch and then the five. In the case of the WD-1793 (which, by the way, is the FDC or Floppy Disk Controller used in the Radio Shack Disk Color System), the 12 volt supply must go on at the same time or before the 5 volt. The 12 volt must also be shut off before the 5 volt. That is a lot to ask for, just to turn the computer on and off. Next, I tried a relay to switch the 12 volt on and off, but that was just not fast enough. Well, that is why the LM-723 chip suited this case so well. It can be switched on and off by an external source and was fast enough to boot!

The first thing you must do (like always) is to get parts. There are not a lot of parts and are all available at your local Radio Shack store. Here is a list of parts you will need:

Quantity	ID	Description	RS#
1	IC-1	LM-723 (voltage regular)	276-1740
1	TI	12 volt transformer	273-1385

(Tony DiStefano is well known as an early specialist in Color Computer hardware projects. He is one of the acknowledged experts on the "insides" of CoCo.)

1	D1	50v bridge rectifier	276-1151
1		Perf board	276-158
1	C3	1000uf @ capacitor @ 35v	272-1019
1	C1	10uf @ capacitor @ 35v	272-1013
1	C2	100pf capacitor @ 25v	272-123
1	Q1	2N2222 transistor	276-1617
3	R1,2,5	4.7 ohm ½w resistor	271-8019
2	R3,4	15k ohm ½w resistor	271-8036
1		14 pin socket	276-1999

There is also the regular paraphernalia like wire, screws, and solder, etc., that you must get. I'll leave that for you to figure out. Next, mount all the components (except the IC) on the perf board according to the photo of my prototype. The component layout is not too important since you are doing point-to-point wiring. Wire the components according to the schematic in Figure 1. The two 15k resistors in parallel are there because I needed a 7.5k resistor and Radio Shack did not have one. The only problem you will have is with the power transformer. The pins do not quite fit in the holes. Make a mark on the board where the pins sit. Use a small drill and widen the holes so that the transformer will fit in. Check the wiring carefully. Now it is time to test it. Please do not install this power supply before you test it. Putting more than 12 volts on the controller will cause many dollars of repair. Plug the IC in the socket. Make sure that pin 1 of the IC is pin 1 of the socket.

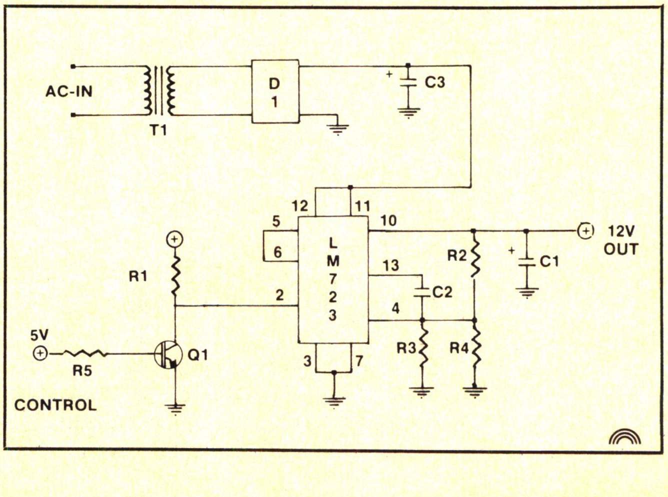
transformer to the AC line of the CoCo 2. The polarity is not important in this case. The two points to solder are the center one and the right side one. That puts our circuit on the side of the fuse. It saves us from putting in another one. Plug the CoCo 2 in and measure the voltage at the output. It should be zero volts. Now take the control wire and touch it to the plus side of the 1000uf capacitor. The output voltage should jump up to 12 volts. If it does, it is okay and time to install it into your CoCo 2. If not, back to the drawing board and check the wiring again. The output voltage should not vary more than five percent. If it does, try changing the voltage divider resistors. The three resistors that control the output voltage are R-2, R-3 and R-4. Do not change these values by much, just try another of the same value; it might have enough difference.

The final thing to do is to mount the board properly and make the rest of the connections. Again, make sure that the CoCo 2 is unplugged when soldering to the computer. The transformer just fits under the keyboard. Use four screws to secure it to the base. Solder the ground wire of the power supply to the ground on the main board. The base of two diodes that are on the bottom left is just fine. The control input can go to any 5 volt location on the main board. I put it on the top side of C-28. The only wire left to connect is the output. That connects to pin 2 on the cartridge connector. When you solder to it, make sure that you don't short out any other pin. The last test to do is to check the 12 volt pin. Plug the CoCo 2 in and leave it off. Measure the voltage at pin 2 and ground. It should be zero volts. If not, check your work again. Now turn the computer on and the voltage should jump to 12. If so, turn it off and plug the controller (or other) into the computer. Turn it back on and measure the voltage. If it is 12 volts, turn everything off and close it up. That is all there is to it.

A lot of people have been calling me about the CoCo 2 64K article. It seems that there is a revision "B" on the CoCo 2 and that they could not get it to recognize the 64K. I have not seen this revision myself, but from what I hear through the grapevine, it should work anyway. If anyone can tell me for sure, send me a line.

The article "ROM Switcher" has a bug in it. The two resistors that solder to pin 1 of the chip do not go to pin 1. I took a photo of the wrong chip and therefore made an error on the pinout. They should go to pin 24. If you tried this out and found that it didn't work, that is the problem. Just do the modification and all will work okay. It should not have caused any damage to the chips or the computer. 'Till next time.

Figure 1



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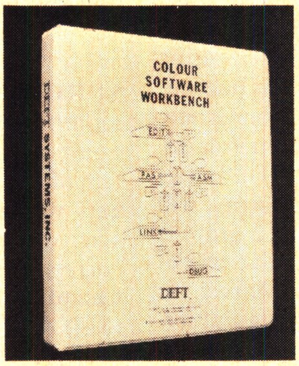

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- Arithmetic, Boolean, and Set Expressions
- Statements: IF, WHILE, REPEAT, CASE, GOTO, EXIT, FOR, BEGIN, assignment (:=)
- Input/Output: RESET, REWRITE, READLN, EOF, WRITE, WRITELN, CLOSE, PAGE
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ADVANCED PASCAL
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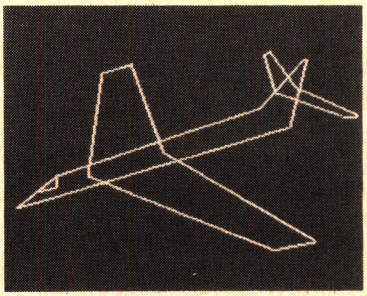
- Type Extensions for Structured Type Breaking
- Absolute Memory Access via Built-in WORD and BYTE Arrays
- ROM Routine Access via CALL Built-in Function
- Static and Public Variable Allocation
- Separate Compilation and Assembler Interface via INTERFACE, EXTERNAL, and PUBLIC
- Listing and Multiple Source File Directives
- Explanation of Error Messages

6809 MACRO ASSEMBLER
- Motorola Compatible Source Conventions
- Macro Facility With up to 9 Macro Parameters
- Separate Compilation and Pascal Interface via PUBLIC and EXT Directives
- Listing Control Directives
- Explanation of Error Messages

TECHNICAL NOTES
- CoCo ROM Compatibility
- Pascal Runtime Library Assembler Interface
- CSW Object File Format



Hi-resolution and 3-dimensional skeletal **graphics** packages included. This includes full Pascal & Assembler source code. Includes:
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PIPELINE

RADIO SHACK'S NEW electronic Express Order Software program is up and running. In order to meet the needs of customers requiring specific market-proven or special application programs not available through their regular product line, Radio Shack is now offering their customers software from a broad spectrum of nationally recognized vendors. We feel that this is an extraordinary service for users of TRS-80 computers in that they (we) can walk into any Radio Shack Computer Center or store and have orders electronically transmitted to Tandy's Fort Worth warehouse, where they will be filled and shipped by the following day. The marvels of computerized shopping!

By the way, any of you software authors and vendors who wish to have your products considered for inclusion in this program should write to Express Order Software Program, 1300 Tandy Center, Fort Worth, TX 76102.

* * *

ONE DUMP, OR TWO? Something you might think of ordering via their new express ordering system is Radio Shack's just-released *Hi-Res Screen Print* utilities program. it's actually two programs in one package, which will allow you to perform both black and white and color screen dumps.

The color dump program works especially well with *Micropainter*, we're told, and gives the option of selecting a color set for printing. You'll need a CGP-220 ink-jet printer to take advantage of the color program, while most any of Radio Shack's dot matrix printers will handle the black and white. You'll also need a minimum 16K Extended system for both. An excellent buy at $9.95; the catalong number is #26-3121.

* * *

SADDLESORE HE AIN'T; it's just not that far on horseback. But, nevertheless, Tom Mix has corralled *Cu*ber*, *The King*, *Junior* and all the other software critters from the Tom Mix ranch and moved to a new address: 4285 Bradford N.E., Grand Rapids, MI 49506. If he hasn't been caught in a *Trapfall* on a *Journey to Mt. Doom* and become *Buzzard Bait*, you can reach him by phone at his new number: (616) 957-0444.

SPIDERMAN, THE HULK and all the other Marvel comic book brood of super heroes met recently with Scott Adams, emerging with an announcement of a multi-million dollar licensing agreement between Adventure International and Marvel Entertainment Group.

The terms specify that Scott Adams' Adventure International, the Longwood, Florida, software company, will market a series of at least 12 graphic Adventures featuring the entire cast of Marvel super personalities. Marvel, on the other hand, will create a special series of companion comic books — tentatively called Quest Probe — which will tie into these programs.

If our experience with these groups individually is any indication, this combined effort ought to be a real blockbuster. The initial product release is due to hit (bam! oof!) dealer shelves by late Spring.

* * *

WHERE'S THE BEEF? "With just a small investment of time and effort, you can be on the road to an independent business and an extra income without giving up the security of a full-time job," reads the promotional material accompanying *Moonlighting With Your Personal Computer*, a World Almanac Publications book by Robert J. Waxman. Under the heading of "How To Make Extra Money In As Few As Two Hours A Week," the press release says that the major portion of the book features step-by-step breakdowns on "the six most accessible areas for the computer freelancer: consulting, writing, system houses, software packaging, contract programming and service bureau specialist." The 160-page book is said to be the first to provide "a blueprint for transforming a home computer from a piece of furniture that plays space games into a valuable source of freelance income."

While *Moonlighting* is billed as "An Insider's Advice On How You Can Earn Thousands of Extra Dollars," we found it to be a rather cursory overview, short on details and long on such gems as "It doesn't hurt to have an impressive signature," and the advice that business cards are "an absolute must," so "collect a lot of them."

Our favorite topic in *Moonlighting* — and the only one we saw treated twice — is "Good Luck."

When it comes down to providing solid, professional advice on how the home computer user can make a little extra moolah with his machine, this book leaves us feeling like the little old lady at the hamburger counter: We don't think there's anybody back there!

* * *

SORRY, WRONG NUMBER. Last month, when we were listing the phone numbers for Bob Rosen's growing system of bulletin boards, one of the numbers we gave you was incorrect. Let's start over with a complete list of all *correct* numbers. First, for Bob's new Canadian boards (in Montreal), call (514) 845-5452. This number will connect you to any open board among the four recently installed there. The numbers for the Rainbow Connection, in New York, all share area code "212," and are as follows: 441-3755; 441-3766; 441-5719; and 441-5907.

* * *

HERE'S A GREAT OFFER if you're in the market for a proofreader program. Star-Kits Software Systems Corporation has released *Spell 'N Fix II*, which will be sent at no charge to anyone who sends Star-Kits a blank disk and a self-addressed stamped disk mailer. The program, as well as all documentation, will be on the disk, and users may print their own manual from the disk.

Star-Kits' president Peter Stark says that *Spell 'N Fix II* users are encouraged to provide free copies to friends, and the program is accompanied by a request that satisfied users make their own estimate of the program's worth to them and send a proportionate contribution to Star-Kits to encourage the further development of such programs.

He said that the decision to provide *Spell 'N Fix II*, previously advertised at $69.29, was a difficult one, but he felt it was a better alternative than strong copy protection that would impose too much of a burden on legitimate purchasers. "Based on our experience with the original *Spell 'N Fix*, we're convinced that many CoCo owners will get copies of the new *Spell 'N Fix* in a relatively short time. We're sure they will love it, and only hope that enough of them will actually send us a contribution."

We do, too, Peter. That's a very generous offer.

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Starting Your Own Computer Business — The First Steps

By Tom Nelson
Rainbow Contributing Editor

You're ready for the leap into your own computer business. You know what you want to do and everyone is behind you 100 percent. So how do you do it?

The path is different for every person, but the basic considerations are the same. You have to consider location, financing, product or service development, packaging, marketing and organization. Some of these are only of paramount concern when you are just starting; others are a constant worry. Let's talk about the basics of forming your business organization.

Of course, financing is bound to be one of your first thoughts. If you are starting your own software company, you might be able to sell out of your house, maybe only part time at first. The financial requirements for this are not that great. There's advertising, media, packaging, the phone bills and other minor considerations. On the other hand, if you're starting a computer software or hardware store, the financial requirements are considerably greater. There's rent, stock, utilities, shelving, employees and on and on.

Financing is not easy to obtain if you need it. When just starting, the usual avenues are open to you: your savings, a second mortgage on your house, maybe even a bank loan. After you've established yourself you can look into bigger bank loans, venture capital, maybe even a public stock offering.

Once you've got your finances straightened out, it's time to consider under what form you wish to run your business. This decision, like almost every decision you are going to make, has great tax implications. You'll find that business decisions are almost always tax decisions. It is, therefore, important that you make the right decisions when you start out. Otherwise, you might find that your decisions have cost you thousands of dollars later.

There are several different types of business organizations. The most common are the sole proprietorship, the partnership, a subchapter S corporation and a regular corporation. Of course, there are many variations even within these.

So, which should you choose? It depends on your needs, abilities, finances, and so forth. Let's take a look at each of these forms of business organizations.

A sole proprietorship is a business run by one person. That's pretty simple. You can hire as many people as you like and still be a sole proprietorship. A sole proprietorship has no special tax advantages, or other advantages for that matter. The profits are all attributed as the personal income of the owner; there is no separate business entity. The owner is also liable to the full extent of his or her assets for any injury or liability arising from the business. Your other investment property can be taken to pay for a liability arising from your separate business. As you can see, insurance is very important to a sole proprietor.

A partnership is a business run by two or more persons who agree to share the losses, the profits and all liabilities. It usually is organized by a formal agreement to take care of all contingencies. Partnerships are not separate entities under the law for tax purposes. At the end of the year, the profits

---

(Tom Nelson was formerly a special assistant attorney general for the State of Minnesota. He currently is general counsel for Softlaw Corporation, makers of the VIP Library™ *and of* ColorQuest™ *games.)*

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See Paul Hoffman's review of Graphicom in this issue !

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are shared among the partners and are considered their personal income for tax purposes; of course, losses may also be attributed to the partners' individual incomes for tax purposes. If there is any injury or liability arising from the partnership, each partner is liable to the full extent of his or her personal assets. Again, insurance is very important.

A corporation is a state-granted charter to run a business with limited liability. A corporation is a separate entity, almost a person, in the eyes of the state. The major advantage of forming a corporation is that liability of the shareholders is restricted to their interests in the corporation. If someone falls down an elevator shaft and sues the corporation, the shareholders will only be liable for the amount they own in the corporation. Thus, your other investment property cannot be taken to pay any judgment.

Because of this nifty "corporate veil," the corporate form of business organization has become the most popular by far. With the rise in popularity of the corporation has come tax laws specially geared for the corporation. Since the corporation is a separate entity, it is also separately taxed. Profits made by the corporation are taxed before they are divided, as dividends, to the shareholders. This is the infamous double tax.

Congress felt that the double tax created for the corporation was too great a hindrance to small businesses, which also need the "corporate veil" provided by the corporate form of business. In response, a special subchapter S corporate form was created to provide tax relief. The subchapter S form gets its name from the subchapter of the tax code which created it.

The subchapter S corporation is essentially a partnership within a corporation. The corporation is treated as a separate entity for liability and many other purposes, but it is not separately taxed. Instead, the shareholders are taxed on all profits attributable to the corporation, whether or not the shareholders receive a dividend, here called a distribution. Thus, if your subchapter S corporation made $50,000 and you are the sole shareholder, you are individually taxed on $50,000 even if you do not take it out of the corporation.

This is just like the partnership arrangement. The advantages are that you have the protection from liability, and the business can be run more like a partnership.

There are several stringent requirements to be met to attain subchapter S status. This was done to limit flight from the double tax of the regular corporate form.

Back to regular corporations. Corporations can be classified as privately held corporations and public corporations. The shares of privately held corporations are not offered to the general public for sale, and do not appear on a stock exchange. Usually, the shares of privately held corporations are owned entirely by working shareholders who occupy the board of directors and the officer positions. The financial affairs of privately held corporations are not subject to public scrutiny, except for the IRS.

On the other hand, shares of public corporations have been offered to and bought by the general public. They are traded on stock exchanges. Because the public is able to buy the stock, public corporations are subject to many disclosure rules so that the public can be adequately informed before they buy stock.

When the time comes for you to choose, which should you select? The more complex the organization, the more the paperwork and planning. To take advantage of the tax laws you will have to be prepared to pay for the expertise to adequately prepare and plan.

Still, you shouldn't let some initial expense and a little extra paperwork stand in the way of the proper organization. In many states you can create a corporation even if you will have only one shareholder, only one director and one officer, i.e., a sole proprietorship.

I recommend the corporate form of business if at all possible. This is because there are significant legal liabilities to which you could become subject. Although you could protect yourself with insurance in the other form of organizations, and although you will want to insure yourself even if you have a corporation, it is better to have that built-in statutory protection. The question then becomes which form of corporation you should select. Despite this advantage, your state may not allow sole proprietor-type corporations. You'll have to look into your state laws.

In return for this protection you'll have to hold periodic shareholder meetings and board of director meetings, keep minute books, and keep up appearances. You also will have to do some special tax and other planning that H & R Block might not be able to do alone.

Okay, so the corporate form may be best. Which is best —the subchapter S corporation or the regular corporation? Quite frankly, the considerations are much too complex and individualized to be dealt with here.

In fact, the whole area of business organization is rife with pitfalls. Whatever your decision, you cannot do it alone. As I said before, any decision will have significant tax and legal consequences. It is imperative that you get yourself a good attorney and accountant who can work together to help you. This will cost money, no kidding. The alternative is equivalent to cutting off your head. Literally thousands of dollars rest in the balance, and your decisions now will greatly affect your ability to use certain tax shelters and loopholes in the near and distant future. The investment in the professions will be well worth it.

Once you've got your business on a sound legal and tax basis, you can begin to run it with security. You know you have a solid business plan, whatever you plan to do.

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SCHOOL IS IN THE HEART OF A CHILD

"In asphodelian fields we sang
Like birdsong ours were blended,
Rewards so sweetly garn'rd when
Through ancient caves we wended . . ."
— anon

'Through Ancient Caves We Wended'

By Fran Saito & Bob Albrecht
Rainbow Contributing Editors

"School Is in the Heart of a Child" is for parents of quite young children. We want to help you work and play with your three- to eight-year-old child and learn to use computers as a joyful family experience. We want to suggest ways to incorporate the home computer as another means to encourage your child's independence, growth, and control over his own life. See the pride on her face as she directs the computer to do what she with deliberation selects. See her head gears switch to "on" as she progresses step by step with your presence and caring direction.

We will explore (we hope, with *your* help) the following:

- Specific "teaching" techniques so that the discovery can be the child's own.
- Critical evaluation of software based on extensive playtesting in family and related environments.
- Additional resources to consult: books, magazines, software publishers, networks, etc.
- Suggestions for interludes and fun times away from the computer (a must!): call the librarian for specific information; watch a TV program together and discuss it; work together as volunteers in a community project; take a fall (or spring or winter or summer) awareness walk . . .
- Whatever we learn from families we work with in Menlo Park or from you, our readers. Let's pool our knowledge. Let's share our experiences as we all learn from our children.

We will also provide many small programs you can type in and use right now.

Copyright© 1983 by Dragon Quest, P.O. Box 310,
Menlo Park, CA 94026

The most effective learning environment is the family unit, parents and children playing, working, learning together. Computers can bring people together in a joyful learning experience.
— Laran Stardrake

Mining Rainbow Gold

We continue prospecting in the caves of *the Rainbow*. Again our search yields nuggets from past issues. This time, we present some of our discoveries in wandering from July through September, 1983. Here are snippets from reviews of educational software designed for kids three to eight years old. We encourage you to dig out your back issues (or get the back issues) and read the entire review.

July 1983

This cave was relatively barren — no reviews of educational software appropriate for our interest, three- to eight-year-old kids.

August 1983

Page 24. "*Mathwar* Offers Skill Drill Plus Game." Review by Stephanie Snyder, who really likes this game. *Mathwar* helps kids learn simple addition and subtraction with four levels of difficulty. Sounds like it has some *staying power*!

(Fran Saito holds a degree in education from the University of Hawaii and has taught preschool and elementary students. She feels her inspiration comes from Mariko, her five-year-old daughter. Well-known author Bob Albrecht also writes the "GameMaster's Apprentice" feature for the Rainbow *each month.)*

Ms. Snyder says, "In my estimation, *Mathwar* is a terrific program for kids of all ages."

From: Harmonycs, P.O. Box 1573, Salt Lake City, UT 84110.

Page 232. "Two 'Bumbles' Make Learning Enjoyable." Review by Michael F. Garozzo. Again, in *the Rainbow*, a reviewer has given a favorable review of *Bumble Games* and *Bumble Plot*.

We have also seen favorable reviews of these games from other computer publications. Michael Garozzo says, "The Follett Library Book Company has developed, through The Learning Company, two programs for teaching children how to locate positions on arrays and grids. According to the introduction, students . . . will need this skill to find streets on maps, to build charts and graphs and to design computer graphics. This reviewer would add latitude and longitude."

We believe that learning to read maps and find your way from place to place is an important basic skill, perhaps more important than number-crunching. Hmmm . . . suppose you play *Bumble Games*, then go to the playground and map it, or make a map of your neighborhood, or use a map of your neighborhood to go from place to place, or . . . and so on. Let's blend computer learning with real-life learning. We would love to hear from people who do this with their own kids.

Bumble Games and *Bumble Plot* from: Follett Library Book Company, 4506 Northwest Highway, Crystal Lake, IL 60014.

September 1983

This issue focuses on education, so it is extra-rich in reviews of educational software. There are also several articles you might like to read. Here are our snips from selected reviews.

Page 120. "A Good Program With One Sour Note." Review by Mark Williams. *Music Drill* is a "drill and practice" program to help you or your child practice sightreading. It runs on 16K ECB. Mr. Williams likes the program, except for the scoring system, and he recommends the program.

From: Computer Island, Dept. R, 227 Hampton Green, Staten Island, NY 10312.

Page 128. "The Tooth Of Time, Byte By Byte." Review by James Ventling. *Time Teacher* helps a kid learn to tell time with either a traditional or digital clock. James Ventling concludes, "All in all, this is an excellent program for the home or classroom. Sound is used effectively throughout, neither overpowering the material, nor making wrong answers entertaining. Graphics are clear and the program is easy to use. Some adult guidance may be needed at first, but kids will quickly learn to use this program without help."

From: Crystal Software, 6591 Dawsey Road, Rock Creek, OH 44084.

Pages 136 and 137. "*Vocabulary Builder* Gets Constructive Criticism." This is a long review (most of two pages) by Dr. Charles H. Santee. He does not recommend the program and, in his review, is very specific about his objections to the program. He offers several constructive criticisms for improving the program. We disagree with a couple of criticisms in principle, but have not tried the game. We would like to playtest this game. We would also like to hear from you people out there who have used this game with your own kids.

From: Computer Island, 227 Hampton Green, Staten Island, NY 10312.

Page 138. "*Match & Spell* Sparks Enthusiasm For Learning." Review by Kenneth D. Peters. We especially like these paragraphs:

"I think *Match & Spell* is an excellent program and provides a well-balanced and effective intermingling of play time with spelling drills, in contrast to some spelling/math drills which require you to reach a certain performance before being rewarded with play.

"The program runs well and is *very easy* to use. (My wife wanted me to be sure and say that, as she has commented that *Match & Spell* is one of the easiest programs she has had to help the younger kids with when I'm not home.) Younger children, around age six and under, may need some help and guidance to read the prompts, etc., at first, but they catch on fast! The word list can be changed readily to accommodate appropriate vocabulary. For my youngest daughter, age four, we use words like family members' names, her name, dog, cat, etc."

From: Harmonycs, P.O. Box 1573, Salt Lake City, UT 84110.

Page 170. "Old MacDonald's Farm Vowels A-E-I-O-U." Review by Michael Hunt. This program works with the cassette recorder to help kids learn the sound of long and short vowels. Michael Hunt says, "Correct responses are rewarded by a smiling face and "Old McDonald's Farm" is heard. If a response is incorrect, the student is given a clue and prompted to try again. Once the correct response is given a smiling face is seen. Negative reinforcement is never used. Scoring is kept at the bottom of the screen. The scoring format is handled nicely and allows the parent or teacher to easily determine which items were missed on the initial try."

He recommends the program for you, your child, and your 16K CoCo with ECB.

From: Teksym Corp., 14504 County Road 15, Minneapolis, MN 55441.

Page 242. "Bibbits and Gribbits in *Moptown Hotel*." Review by Pat, Don, and Chris Dollberg. We love this review by a family — mama, papa, and 11-year-old daughter. More reviews like this, please! Here are a couple of snippets from this delightful review.

"Ever since the *Moptown Hotel* arrived for review, our family has "adopted" a number of strange but wonderful critters known as the moppets, which inhabit Moptown. Moppets, which come in two kinds — Bibbits and Gribbits — are a real way of teaching children (ages six to 13) the concepts of similarities and differences. *Moptown Hotel* is part of a series of educational programs from the Follett Library Book Co. which includes *Moptown Twin* and *Moptown Parade* — all three packages are available on cassette or disk and require a 16K Extended BASIC Color Computer. The disk version of *Moptown Hotel* is the subject of this review, which we decided to make a family review. Being an educational package, what better way to review the program than to have our 11-year-old program tester (Chris) put the package through its paces.

"The documentation is sufficient since the instructions are included in each program as noted above. However, there might have been more discussion for parents on the concepts of logical thinking. This would help parents to provide guidance to their children. For example, the manual suggests making a deck of moppet cards with some possible games. This is an excellent idea which allows the learning process to continue while mom and dad use the CoCo to blow up space nasties. Overall, we rate the *Moptown Series* as excellent — you can tell your child you're buying a game and he/she will never know it's really an educational game."

From: Follett Library Book Company, 4506 Northwest Highway, Crystal Lake, IL 60014.

Page 245. "*Beyond Words* Is Beyond Words." Review by Stephanie Snyder. *Beyond Words* consists of three language arts tutors for people eight years old and older — all the way through high school! Ms. Snyder reports, "We had many children of all different ages use the program that was suited to their particular age group. The reactions and comments about the programs were all very favorable. All of the children, especially the younger ones, enjoyed the amount of interaction that they had with the computer. My daughter, Shari, who is in the eighth grade, found the subtests for her level very challenging. Very often she complains that 'educational' software written for her age group is too easy."

We want to try this with children younger than eight years old. We think a parent and a child working together can effectively use software supposedly designed for older kids.

From: Computer Island, 227 Hampton Green, Staten Island, NY 10312.

There is still more in the September issue. It's a good back issue to buy if you don't already have it.

Playtesting, First Impressions

ComputerKid, USA! puts computers in the hands of kids in youth organizations, alternative schools, and at home in order to playtest and evaluate educational software in places that are *learner-centered*, instead of *teacher-centered*. We now have the following sites.

Herbert Hoover Boys' Club in East Menlo Park, Calif. Boys and girls of many ages.

A Montessori school in Menlo Park. Kids from three to six years old.

Our own playtest room. Kids and their parents come after school to try out educational software.

Greene Community School, Greene, Iowa. A CoCo in the elementary school library can be checked out for home use. Greene is a rural community of about 1300 people.

Roving CoCos go out on loan to Menlo Park families who will playtest software and report on their experiences.

Roving Software goes out on loan to Menlo Park families who have their own CoCos.

Tim Finger is Director of ComputerKid, USA! He has been doing this full time for two years. He begins by trying programs himself to get the "feel" of the software. Then, he uses the programs with a bunch of kids and learns more by watching them. Finally, the software goes to other playtest supervisors who work with kids and fill out formal evaluation forms. Below is the story of Tim's first playtest of two games from Radio Shack.

Monday, Jan. 23, at the Montessori school. 1:30 p.m. Age Group — upper fours to six.

GAME: *Ernie's Magic Shapes* (Radio Shack).

Tim explains and shows how to load the cassette. He tries to have them type in *CLOAD*, sounding the letters instead of saying them. They seek out the keys on the keyboard and together, slowly, type the word in. Because the loading time is a few minutes, he goes through the accompanying booklet briefly showing characters (Ernie, et al) and the objective of the game. The children respond enthusiastically and are eager.

Child: Why do they use arrows for yes and no, Tim?

Tim: The person who wrote the program decided to do it like that.

Always, in addition to the assigned children, others, one, two, three, gather 'round. Repeatedly, a teacher comes to remind them where they should be. This occurred four or five times with the same kid. How, indeed, do we keep 'em down on the farm after they've seen Paree?!

Tim likes this game and the children respond well, matching colors and shapes. Ernie's nodding to mean yes and shaking his head to mean no seemed to confuse adults, but seemingly not the children. Tim thinks highly of the logo: the wand as a pointer and the rabbit feedback for fruition, well-done. Tim notes and praises the children for working as a team, as together the three work, agree on an answer, and depress a key.

Tim: Why does loading time have to be so long?

Can directions be simplified, even for an adult?

The Montessori School hopes to use the computer simply as another Montessori teaching aid. The child goes to it at will and puts it away after completion. A selection of games is available. For now, it is the teacher who must do the loading, but it is the aim that children will become adept enough to do it themselves.

GAME: *Peanut Butter Panic*, a.k.a. *Peanut Butter Sandwich* (Radio Shack).

Tim, realizing the children are beginning to sound letters and words, goes through the title with his second group of children. They get to "Butter" and after that, guess "Sandwich."

Tim: I didn't like the work "Panic" and thought myself that "Sandwich" was a much better title, so that's what it became.

Tim and children go through a spirited practice of identifying left, right, middle, and up. The children respond to Tim's commands. "Raise your right hand. Raise your left hand. Raise one finger." They respond eagerly, concentrating, thinking hard.

Tim brings the commands back to the computer and plays the left-right game further. Now, instead of four there are eight heads gathered 'round.

The objective of the game, to see how many stars nutniks can eat, requires eye-motor coordination and dexterity with the joystick and button. Also, cooperation at a more advanced stage. The nutnik is rewarded with a peanut butter sandwich when he makes a catch.

The children like this game, too. Tim does not like the concept of "eating" stars, so substitutes "catches" throughout the game.

Florence: Tim, you're a good computer teacher.

Tim: Thank you. And you're a good computer student.

Florence: I'm not a student.

Tim: What are you then?

Florence: I'm a kid!

Help! Are you using educational software with your own three- to eight-year-old kid? If yes, would you help us by filling out some evaluation forms? Send us a self-addressed, stamped envelope and we will send you some forms. Fran & Bob, P.O. Box 310, Menlo Park, CA 94026.

Guess And Learn

Here are a couple of guessing games. The first is from *TRS-80 Color BASIC* by Bob Albrecht.* The other is new, we think.

---

*Albrecht, Bob. *TRS-80 Color Basic*. John Wiley and Sons, Inc., 605 Third Avenue, New York, NY 10158.

```
100 REM**GUESS MY TONE SCH 3-1
200 REM**TELL HOW TO PLAY
210 CLS
220 PRINT "I'LL PLAY A TONE. YOU
 GUESS"
230 PRINT "MY TONE NUMBER, 1 TO
255."
300 REM**PLAY RANDOM TONE
310 T = RND(255)
320 PRINT
330 PRINT "GUESS THIS TONE"
400 REM**SOUND TONE & GET GUESS
410 PRINT: SOUND T, 20
420 INPUT "YOUR GUESS"; G
500 REM**IF INCORRECT, GIVE HINT
510 IF G<T THEN PRINT "TRY A BIG
GER NUMBER": GOTO 410
520 IF G>T THEN PRINT "TRY A SMA
LLER NUMBER": GOTO 410
600 REM**WINNER!
610 PRINT "THAT'S IT! YOU GUESSE
D MY TONE."
620 SOUND T, 120
700 REM**GO PLAY AGAIN
710 GOTO 210
```

This, of course, looks like the traditional "guess my number" game, except that the number being guessed is the number of a musical tone on the CoCo.

Next, here is our *Cosmic Guess* game. You guess which planet the CoCo is "thinking of." If you miss, the CoCo tells you to go closer to the sun or farther from the sun.

```
100 REM**COSMIC GUESS SCH 3-2
200 REM**PUT PLANETS IN ARRAY
210 FOR P=1 TO 9
220 : READ PLANET$(P)
230 NEXT P
240 DATA MERCURY, VENUS, EARTH
250 DATA MARS, JUPITER, SATURN
260 DATA URANUS, NEPTUNE, PLUTO
300 REM**TELL HOW TO PLAY
310 CLS
320 PRINT "I'LL THINK OF A PLANE
T. GUESS"
330 PRINT "WHAT PLANET I'M THINK
ING ABOUT."
400 REM**SELECT A PLANET
410 P = RND(9)
500 REM**GET A GUESS
510 PRINT
520 INPUT "WHAT PLANET"; G$
600 REM**LOOK FOR G$
610 FOR K=1 TO 9
620 : IF G$=PLANET$(K) THEN 710
630 NEXT K
640 PRINT "I DON'T KNOW " G$
650 GOTO 510
700 REM**G4 IS A PLANET
710 IF G$=PLANET$(P) THEN 810
720 IF K>P THEN PRINT "TRY CLOSE
R TO THE SUN."
730 IF K<P THEN PRINT "TRY FARTH
ER FROM THE SUN."
740 GOTO 510
800 REM**GUESS IS CORRECT
810 PRINT
820 PRINT "GOOD FOR YOU! YOU GOT
 MY PLANET."
900 REM**TELL HOW TO PLAY AGAIN
910 PRINT
920 PRINT "TO PLAY AGAIN, PRESS
ANY KEY.";
930 IF INKEY$="" THEN 930
940 GOTO 310
```

Gamblers Beware!

Since much that happens in life is a gamble, and this is our gamblers' issue, perhaps it is good to learn how to learn by experience. Here is a simple game that might provide some surprises. The first game simply flips a coin and lets the player guess H#(heads) or T#(Tails). You can make the coin fair or unfair.

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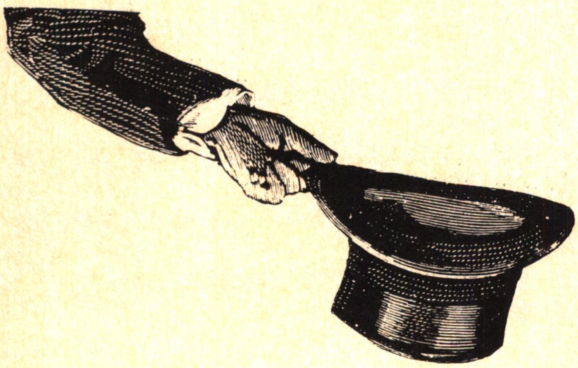
SPELL 'N FIX II



Nowadays, when you go to the theatre, you first pay your money and then go to the show ... and hope you enjoy it. But it wasn't always like that. Centuries ago it was the other way around. First you saw the show. Then the performers passed their hats around. If you enjoyed the show, you put money in the hat. The more you enjoyed it, the more you put in.

We're going to try the same approach with software.

INTRODUCING PASS-THE-HAT SOFTWARE

It works like this. Send us a formatted disk along with a stamped, self-addressed mailer. We will use it to send you a copy of SPELL'N FIX II. We also give you permission to copy the disk as much as you want and give copies to all your friends.

After you've had a chance to use it, that's where the hat comes in. We want you to decide for yourself what the program is worth to you, and send us a contribution. (Hint: send a LOT if you really like it!)

WOW! WHAT A PROGRAM!

SPELL 'N FIX II is not just for spelling mistakes — it catches typos too. It really makes sure that your word processing output is perfect. Easy to use too. Reads your text, fixes your mistakes, lets you look up the spelling of bad words in its dictionary file, even lets you add words to the dictionary. Color Computer Magazine called the original SPELL 'N FIX "a top-drawer piece of software" ... and SPELL 'N FIX II is even better! Originally advertised for $69.29, it beats the $200—$300 dictionary programs for other computers — hands down!

COMPARISON CHART

	Radio Shack Color Dictionary 26-3265	Original SPELL 'N FIX	New SPELL 'N FIX II
Checks SCRIPSIT (R) files	YES	YES	YES
Checks other text processor files	NO	YES	YES
Checks Basic data files	NO	YES	YES
Checks files larger than memory	NO	YES	YES
Full upper and lower case display	NO	NO	YES
Add words from dictionary	NO	YES	YES
Delete words from dictionary	NO	YES	YES
Custom dictionaries possible	NO	YES	YES
Comes with error-free dictionary	NO	YES	YES
Usable for foreign languages	NO	YES	YES
Checks and fixed in one pass	NO	NO	YES
Shows suspect words in context	YES	YES	YES
Usable with just one diskette	NO	YES	YES
Looks up words in dictionary	YES	NO	YES
Looks up words while correcting	NO	NO	YES
DIR command allowed during run	NO	YES	YES
Uses standard Basic file format	NO	YES	YES
Price	$59.95	$49.39	FREE

(Note: SCRIPSIT is a trademark of Tandy Corporation)

STAR-KITS
SOFTWARE SYSTEMS CORPORATION

P.O. BOX 209 R MT KISCO, NY 10549 (914) 241-0287

STAR — KIBBITS

This month I have some good news and some not-so-good news. First the not-so-good news.

This is my last Star — Kibbits column. I have really enjoyed the chance to sound off on my favorite little computer each month, but the pressures of meeting a monthly deadline are getting to me (as you've probably noticed from my missing last month's.) I've gotten some very encouraging comments from some of you readers about this column, but I am afraid that the time has come to say goodbye.

Now for the good news.

PASS-THE-HAT SOFTWARE

A few months ago I tried an experiment. Instead of selling our Commterm communications program for the CoCo and MC-10, I decided to give it away free, but ask users to send us some money if they liked the program and used it. In reviewing the program for HOT CoCo Magazine, Douglas Swank called that the "Pass-the-Hat" sales method. I hope he doesn't mind if I borrow the name and extend the idea to SPELL 'N FIX II as well.

It's too early to tell whether we're going to lose our shirts on this idea, but my hope is that enough people will send us a contribution to make it possible for us to continue. It is a gamble and only time will tell whether we are making the right decision or not, but with today's high cost of doing business it is clear that we must change our marketing methods if Star-Kits is to survive.

If you would like to get your free copy of SPELL 'N FIX II, send us a disk with a stamped mailer. (Send a cassette for Commterm). We will return the disk with the program. The operations manual is also on the disk, and you can print it out yourself. We also give you permission to make copies and pass them out to your friends.

In return, we ask that each user decide what the program is worth and send us a contribution. Hopefully, you'll think it's worth a lot, but even a small contribution is better than nothing.

WHAT DO YOU THINK?

What's your opinion of this hare-brained scheme? Do you think we're ready for the loony bin? Should we do it for our other software as well? I'd love to hear from you!

DOUBLE — SIDED DISKS

We are selling a complete disk system with a disk controller, a double-sided 40-track drive, cabinet, power supply and all cables, all for $400. The advangtage, of course, is that the double-sided drive gives you the capacity of two regular drives for just slightly more than only one.

If you currently have a double-sided drive, send us a large self-addressed stamped envelope and we will send you free details on how to use it with your CoCo.

That's it for this month — see you next time.

SPELL 'N FIX II

Regardless of whose text processor you use, let SPELL 'N FIX find and fix your spelling and typing mistakes. It reads text faster than you can, and spots and corrects errors even experienced proofreaders miss. It is compatible with all Color Computer text processors. Part of our Pass-the-Hat program. Send a disk and stamped mailer for your free copy. Older SPELL 'N FIX I is now priced at $49.39 tape or disk. Both include a 20,000 word dictionary.

HUMBUG® — THE SUPER MONITOR

A complete monitor and debugging system which lets you input programs and data into memory, list memory contents, insert multiple breakpoints, single-step, test, checksum, and compare memory contents, find data in memory, start and stop programs, upload and download, save to tape, connect the Color Computer to a terminal, printer, or remote computer, and more. HUMBUG on disk or cassette costs just $39.95, special 64K version for FLEX or STAR-DOS 64 costs $59.95, MC-10 version $29.95.

STAR—DOS

A Disk Operating System specially designed for the Color Computer, STAR-DOS is fully compatible with your present Color Computer disk format — it reads disks written by Extended Disk Basic and vice versa. STAR-DOS for 16K through 64K systems costs $49.90.

DBLS for Data Bases

DBLS stands for Data Base Lookup System. A super-fast system for searching for a selected record in a sequential disk file. Supplied with SPELL 'N FIX's 20,000 word dictionary as a sample data file — lets you look up the spelling of any word in under FOUR seconds. Priced at $29.95. Requires STAR-DOS.

CHECK 'N TAX

Home accounting package combines checkbook maintenance and income tax data collection. Written in Basic for either RS Disk or Flex, $50.

REMOTERM

REMOTERM — makes your CoCo into a host computer, operated from a remote terminal. $19.95, disk or cassette.

COMMTERM

A terminal program for your CoCo or MC-10. Part of our Pass-the-Hat software program. Send a cassette and stamped envelope for your free copy.

NEWTALK

NEWTALK — a memory examine utility for machine language programmers which reads out memory contents through the TV set speaker. $20, disk or cassette.

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SHRINK — our version of Eliza, in machine language and extremely fast. $15, disk or cassette.

EDUCATIONAL SOFTWARE

Introduction to Numerical Methods — college level course on computer math, $75.00, disk or casette.

We accept cash, check, COD, Visa, or Master Card. NY State residents please add appropriate sales tax. Add $3 to above price for AMDEK 3" disk versions.

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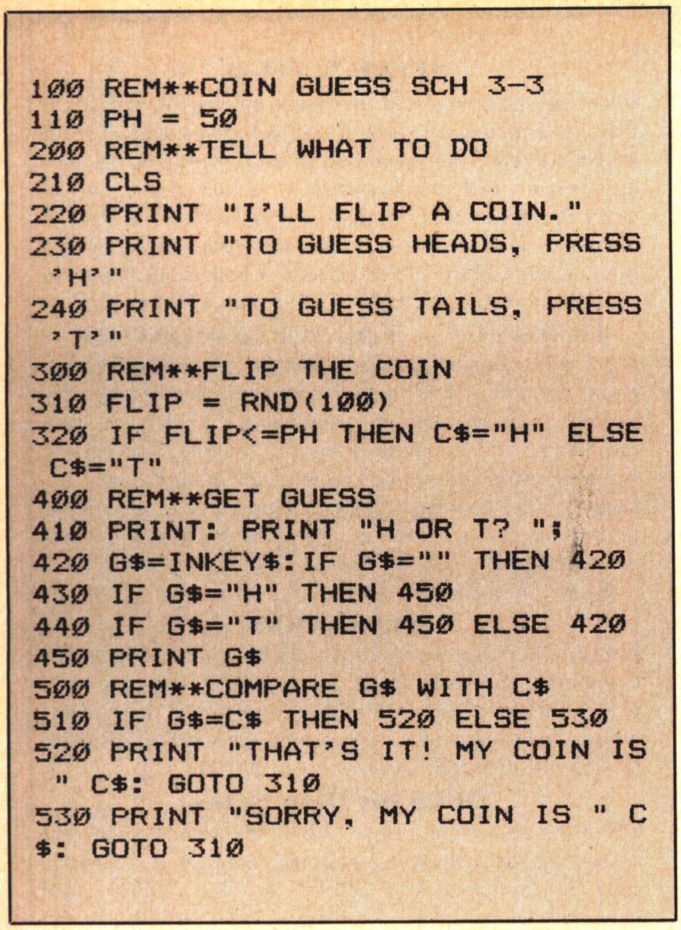

```
100 REM**COIN GUESS SCH 3-3
110 PH = 50
200 REM**TELL WHAT TO DO
210 CLS
220 PRINT "I'LL FLIP A COIN."
230 PRINT "TO GUESS HEADS, PRESS
 'H'"
240 PRINT "TO GUESS TAILS, PRESS
 'T'"
300 REM**FLIP THE COIN
310 FLIP = RND(100)
320 IF FLIP<=PH THEN C$="H" ELSE
 C$="T"
400 REM**GET GUESS
410 PRINT: PRINT "H OR T? ";
420 G$=INKEY$:IF G$="" THEN 420
430 IF G$="H" THEN 450
440 IF G$="T" THEN 450 ELSE 420
450 PRINT G$
500 REM**COMPARE G$ WITH C$
510 IF G$=C$ THEN 520 ELSE 530
520 PRINT "THAT'S IT! MY COIN IS
 " C$: GOTO 310
530 PRINT "SORRY, MY COIN IS " C
$: GOTO 310
```

Enter and *RUN* the program. The CoCo will "flip" a coin with about an equal chance of heads or tails. We expect the player will win about half the time. Keep track of the wins and losses — also keep track of the number of heads and tails.

Then change line 110, which controls the chance of getting heads. For example: 110 PH = 70 will cause the CoCo to get heads about 70 percent of the time. How long will it take the player to discover that the CoCo's coin isn't like an ordinary coin? Encourage kids to keep a written record of heads and tails, perhaps like this:

HHHHHHHHH
TTTT

Looks like H is ahead.

Try other values of PH until everyone gets the idea of keeping records and figuring out whether H or T is the better guess.

Hmmmm . . . can a computer lie? Suppose the computer tells a kid that it will choose CAT or DOG with the same chance of occurring, then actually selects CAT 70 percent of the time? Beware, kids! Learn to be skeptical about computers. People can use computers to help you or hinder you, to give you more freedom, or reduce your freedom.

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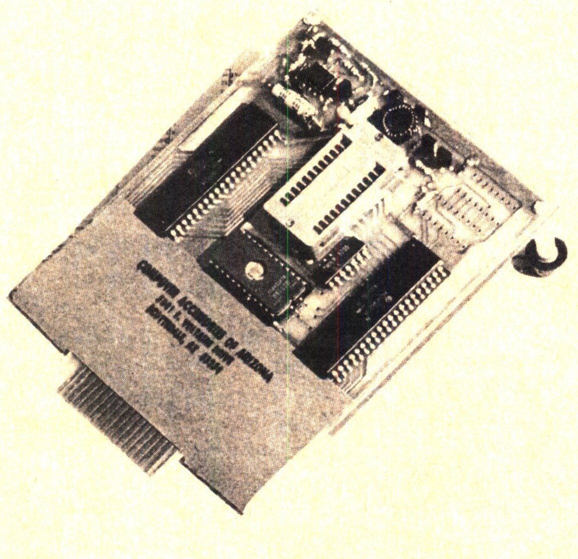

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PROGRAMMING UTILITY

16K

Little E does big job to BASIC

By H. Allen Curtis

(H. Allen Curtis, who earned degrees from the College of William and Mary, M.I.T., and Harvard, recently won an award for meritorious service from the IEEE Computer Society. He has had published a college reference book in the computer science field, as well as many papers and articles.)

You've heard of "Big D." Well, *Little E* could be as important to MC-10 and CoCo users as Big D is to Texas. *Little E* is a programming aid to ease and simplify the keyboard entry, modification or correction of BASIC programs.

The motivation for the development of *Little E* was a decided deficiency in both the MC-10 computer and the Color Computer with Color BASIC alone. Neither of these computers has an *EDIT* command! Most people who make regular use of their computer's *EDIT* command would probably agree that it is one of the most important commands in the BASIC repertoire.

The running of *Little E* does the following. It allows the BASIC interpreter to recognize lowercase E as a new command word. It also allows the execution of the new command upon demand, that is, whenever the lowercase E command is issued.

Henceforth, the new command will be referred to as the *e* command. The *e* command is both simple to learn and convenient to use. Furthermore, it does not require much memory (about .25K bytes, that is, about two-thirds that employed by CoCo's Extended Color BASIC *EDIT* command). Those having Extended Color BASIC may prefer the *e* command to their own *EDIT* command because of the *e* command's simplicity, convenience and ability to move lines of BASIC programming.

The *e* command will presently be described in general terms. Next, *Little E* will be presented and discussed briefly. Once you have keyed in *Little E* correctly and saved it, you will be ready to go through some specific examples illustrating the workings of the *e* command.

The format of the *e* command is as follows:

```
e line number
```

where the line number is any program line number from 0 to 63999 inclusive. Remember, in order to type a lowercase e you must have switched to the upper-/lowercase option mode by pressing [Shift][0].

After you have typed e and the desired line number as well as pressed [ENTER], the designated line of programming will be displayed at the top of the screen. The cursor will be flashing at the top left position of the screen.

Three arrow keys are used to locate the cursor where you want it:

(RIGHT): Pressing the right arrow key moves the cursor one position right without changing the character it covers.

(DOWN): Pressing the down arrow key moves the cursor one position down without changing the character it covers.

(LEFT): Pressing the left arrow key moves the cursor one position left without changing the character it covers.

In the MC-10 the cursor is constrained to move within the first 128 positions of the screen. In the CoCo the cursor may move within the first 253 positions.

Characters can be deleted from the displayed program line by pressing the MC-10's [L.DEL] key or the CoCo's [CLEAR] key. Spaces over which new characters may be typed can be inserted by means of the [SHIFT][@] key. Typing a character key will cause that character to be displayed at the current cursor position and then the cursor will advance one position right. Cursor movement, deletion, insertion and overtyping not only allow you to make changes in a designated line, but they permit changing the line number itself. Thus, you may use the *e* command to write a replica of all or part of a program line at a new location in the program.

Pressing [ENTER] twice will terminate editing and cause the changed line to be included in your program. Before termination if you decide that you do not want the line edited after all, you may "break out" of the *e* command by pressing the [BREAK] key. The designated line will remain unchanged.

Little E, the program that adds the *e* command to your computer's BASIC repetoire, is shown in Listings 1 and 2.

Each value in the *DATA* statements starting at line 90 is a byte of the machine language program that executes the *e* command. BASIC lines 10 through 80 do the following: They reserve and protect the highest RAM area for the *e* command's program into the reserved area. Then they check to see whether or not you have typed the *DATA* statements correctly. If you have made a mistake, you will receive an error message and the program will stop for you to find and correct your error. Finally, when the program is correct, it will cause the execution of the part of the machine language program that adds the *e* command to the computer's BASIC repertoire.

If you are using *Rainbow Check Plus* to aid you in the accurate typing of *Little E*, do not run *Little E* until you are certain that it has been typed correctly. Otherwise, you might overwrite *Rainbow Check Plus* which also resides in the high RAM.

***Little E*, as presented in Listings 1 and 2, cannot be used when you are keying in programs with the assistance of *Rainbow Check Plus*. A version of *Little E* that is compatible with *Rainbow Check Plus* usage is easily derived from the *Little E* version of Listings 1 and 2.**

After you have typed *Little E* correctly and saved it, you can obtain a *Rainbow Check Plus* compatible *Little E* as follows:

Replace lines 10 and 30 of Listing 1 with:

```
10 CLS:X=256*PEEK(16976)-102
30 X=256*PEEK(16976)-101
```

Replace lines 10 and 30 of Listing 2 with:

```
10 CLS:X=256*PEEK(116)-60
30 X=256*PEEK(116)-59
```

When these changes have been made, save the new version of *Little E*. When using *Rainbow Check Plus* and *Little E* together, load and run *Rainbow Check Plus* before loading and running *Little E*. Then *Rainbow Check Plus* will reside in the highest RAM area and the *e* command's machine language program will be in the next highest RAM area.

"[Little E] allows the BASIC interpreter to recognize lowercase E as a new command word. It also allows the execution of the new command upon demand, that is, whenever the lowercase E command is issued."

There is a special comment for those of you having CoCos with Radio Shack disk systems. The disk system initializes addresses 383 through 385 to a 6809E JMP instruction to make entry to a ROM routine that disables the [BREAK] key during disk output. The *e* command uses addresses 383 through 385 for another prupose. Therefore, if you use the *e* command, it will be at the sacrifice of the aforementioned [BREAK] key disable. Moreover, before you type *Little E*, you should type and [ENTER] *POKE 383,57*. Also, after you have correctly typed LITTLE E include the additional line *5 POKE 383,57*.

In preparation for the examples illustrating how the command works do the following: Turn your computer off and then turn it on again. Load *Little E*. *RUN* it. Ordinarily after running *Little E* you would want to load a program whose lines needed some editing or else you would "erase" *Little E* via a *NEW* command before keying in a program. However, some of the lines of *Little E* will be used in the examples, so do not erase it.

Example 1: With the [SHIFT] key depressed, hit the 0 key. Then type *e 320* and press [ENTER]. On the top line of the screen should be displayed the *DATA* statement of line 320 along with the line number itself. The 3 of 320 will not be visible because of the presence of the cursor over it.

1) Press the [→] nine times, that is, until the cursor covers 3, the first digit of the initial value in the *DATA* statement list.

2) With the [SHIFT] key held down, press the [@] key five times. You will have inserted five spaces.

3) Type over the inserted spaces

RAIN,

to add a string to the value list. Notice that the *e* command has switched back to the all-capitals mode.

4) Press the [←] key ten times (until the cursor covers D of *DATA*.

5) Press the [↓] key once. Now, you have positioned the

cursor to add the following:

,BOW,

Make the addition.

6) Terminate the *e* command by pressing [ENTER] twice. The cursor will move to the beginning of the next screen line, but no OK prompt will appear. This is normal for the correct termination of the *e* command.

7) Type and enter *LIST 320* to check that the editing changes have, indeed, been incorporated in line 320.

Example 2: As in Example 1, type and enter *e 320*.

1) Change the line number to 820 by pressing the 8 key.

2) Using the [→] key, position the cursor over the first comma.

3) Press the MC-10 [L. DEL.] key or the CoCo [CLEAR] key as many times as it is necessary to delete all characters separating the words RAIN and BOW.

4) Using the [→] key, move the cursor just beyond W of BOW.

5) Press [ENTER] twice.

6) *LIST 820* to verify that you have added line 820 to the program. Also, *LIST 320* to see that the changes made in the present example did not affect line 320.

Example 3: Type and [ENTER] *e 820*.

1) Use the [→] key to position the cursor over D.

2) Type

?"THE

and then use [SHIFT] [@] to insert a space.

3) With the [→] key, position the cursor just beyond W and type a quotation mark.

4) Press [ENTER] twice.

5) LIST 820 to see the results of your changes.

Example 4: Type and enter *e 820*.

1) Use the right arrow key to move the cursor over B.

2) Press [ENTER] twice.

3) *LIST 820* and note that BOW has been chopped off the previous line 820. In general, only that part of the programming line to the left of the final cursor position will be incorporated into the program as the result of the *e* command execution. This property affords you an easy means of chopping off unwanted characters at the end of a program line.

Example 5: Type and [ENTER] *e 400*.

1) Use [SHIFT][@] to insert a space at the first position on the screen.

2) Type the number 6 over the inserted space.

3) Move the cursor to the space between the line number and D of *DATA*.

4) Use [SHIFT] [@] to insert a space. Overwrite the space by typing the number 0.

5) Move the cursor to the end of the program line (use the down arrow key for part of the cursor move).

6) Press [ENTER].

You will have received an SN Error message because you tried to use an illegal line number; 64000 is a line number higher than the maximum allowed by the BASIC interpreter.

Example 6: Type and [ENTER] *e 65*.

Because there is no line 65 in the resident BASIC program, the *e* command terminates immediately. The OK prompt appears in this case.

Example 7: Type and [ENTER] *e 70*.

1) Move the cursor so that it is positioned at the space between *DATA* and *ERROR*.

2) Use [SHIFT] [@] to insert 10 spaces.

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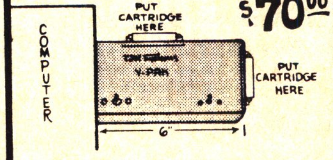

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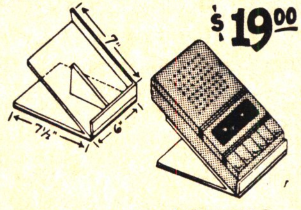

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3) Then suppose you change your mind about editing line 70. Therefore, hit the [BREAK] key.

4) The [BREAK] key termination yields an OK prompt. *LIST 70* to verify that nothing was inserted between the words DATA and ERROR in line 70.

Example 8: This example applies to the MC-10 only. Type and [ENTER] *e 820*.

1) Press the [→] key four times.

2) Use [SHIFT] [@] to insert four spaces.

3) Use the CLS key (CONTROL 8) to insert the command word CLS. Instead of the expected CLS you got a graphics character! This illustrated the fact that the *e* command is restricted to typing one character per key depression. Hence, to type CLS you must press the keys C, L and S in succession.

4) Press the [←] key. Then type

CLS

to make the desired command insertion.

5) Move the cursor just beyond N in RAIN and press [ENTER] twice.

6) *LIST 820* to see that the insertion was made correctly.

There may be some additional features that you would like incorporated into the *e* command. For instance, rather than having to press an arrow key one time for each position the cursor moves, it would be more convenient to have the cursor continue to move until you released the arrow key.

Tables 1 and 2 are now presented for those of you with assembly language experience and an inclination to make *e* command modifications. Tables 1 and 2 show assembly listings of the *e* command program for the MC-10 and the CoCo, respectively.

In both tables the addresses are in hexadecimal and are those associated with 4K RAM systems. Those with 20K MC-10s should mentally add 4000 Hex to each of the addresses. Similarly, those with 16K or 32K CoCos should add 3000 or 7000, respectively, to each of the given addresses. The *e* command program is relocatable, thus, the precise addresses are not of vital concern.

Usually in the assembly language representation of an instruction, the symbol "$" is used to indicate that an address or number is in hexadecimal. Since all addresses and numbers in the tables are in hexadecimal, using "$" becomes superfluous and hence was omitted.

Rather than having a detailed, instruction-by-instruction description of what the program does, a description in nar-

Table 1

```
ADDRESS  M-L INSTRUCTION  ASSEMBLY INSTRUCTION

  4EF6       C6 12             LDA B #12
  4EF8       3A                ABX
  4EF9       FF 42 98          STX 4298    M
  4EFC       86 7E             LDA A #7E
  4EFE       B7 42 97          STA A 4297 M
  4F01       C6 23             LDA B #23
  4F03       3A                ABX
  4F04       FF 42 AA          STX 42AA    M
  4F07       39                RTS
  4F08       BD 00 F3          JSR 00F3    M
  4F0B       81 65             CMP A #65
  4F0D       26 F8             BNE 4F07
  4F0F       7A 42 1C          DEC 421C    M
  4F12       BD FB D4          JSR FBD4    M
  4F15       86 7E             LDA A #7E
  4F17       B7 42 A9          STA A 42A9 M
  4F1A       7F 00 B5          CLR 00B5    M-
  4F1D       BD 00 EB          JSR 00EB    M
  4F20       7E E4 0D          JMP E40D    M
  4F23       FE 42 80          LDX 4280    M
  4F26       96 A6             LDA A A6    M-
  4F28       A7 00             STA A 0,X
  4F2A       39                RTS
  4F2B       7D 00 B5          TST 00B5    M-
  4F2E       26 11             BNE 4F41
  4F30       7C 00 B5          INC 00B5    M-
  4F33       EC 02             LDD 2,X
  4F35       93 A5             SUB D A5    M-
  4F37       27 01             BEQ 4F3A
  4F39       86 39             LDA A #39
  4F3B       B7 42 A9          STA A 42A9 M
  4F3E       7E E2 71          JMP E271    M
  4F41       86 39             LDA A #39
  4F43       B7 42 A9          STA A 42A9 M
  4F46       CE 40 00          LDX #4000   M
  4F49       FF 42 80          STX 4280    M
  4F4C       A6 00             LDA A 0,X
  4F4E       97 A6             STA A A6    M-
  4F50       BD F8 68          JSR F868    M
  4F53       81 09             CMP A #9
  4F55       26 0A             BNE 4F61
  4F57       8D CA             BSR 4F23
  4F59       8C 40 7F          CPX #407F   M
  4F5C       24 F2             BCC 4F50
  4F5E       08                INX
  4F5F       20 E8             BRA 4F49
  4F61       81 15             CMP A #15
  4F63       26 14             BNE 4F79
  4F65       FE 42 80          LDX 4280    M
```

```
ADDRESS  M-L INSTRUCTION  ASSEMBLY INSTRUCTION

  4F68       8C 40 80          CPX #4080   M
  4F6B       24 07             BCC 4F74
  4F6D       A6 01             LDA A 1,X
  4F6F       A7 00             STA A 0,X
  4F71       08                INX
  4F72       20 F4             BRA 4F68
  4F74       FE 42 80          LDX 4280    M
  4F77       20 D3             BRA 4F4C
  4F79       81 0A             CMP A #0A
  4F7B       26 0C             BNE 4F89
  4F7D       8D A4             BSR 4F23
  4F7F       8C 40 60          CPX #4060   M
  4F82       24 CC             BCC 4F50
  4F84       C6 20             LDA B #20
  4F86       3A                ABX
  4F87       20 C0             BRA 4F49
  4F89       81 08             CMP A #8
  4F8B       26 0A             BNE 4F97
  4F8D       8D 94             BSR 4F23
  4F8F       8C 40 00          CPX #4000   M
  4F92       27 BC             BEQ 4F50
  4F94       09                DEX
  4F95       20 B2             BRA 4F49
  4F97       81 13             CMP A #13
  4F99       26 17             BNE 4FB2
  4F9B       CE 40 7F          LDX #407F   M
  4F9E       BC 42 80          CPX 4280    M
  4FA1       27 07             BEQ 4FAA
  4FA3       09                DEX
  4FA4       A6 00             LDA A 0,X
  4FA6       A7 01             STA A 1,X
  4FA8       20 F4             BNE 4F9E
  4FAA       96 A6             LDA A A6    M
  4FAC       A7 01             STA A 1,X
  4FAE       86 60             LDA A #60
  4FB0       20 9C             BRA 4F4E
  4FB2       81 03             CMP A #3
  4FB4       27 88             BEQ 4F3E
  4FB6       81 0D             CMP A #0D
  4FB8       27 0B             BEQ 4FC5
  4FBA       BD F9 C9          JSR F9C9    M
  4FBD       8C 40 7F          CPX #407F   M
  4FC0       27 01             BEQ 4FC3
  4FC2       08                INX
  4FC3       20 9A             BRA 4F5F
  4FC5       CE 42 B1          LDX #42B1   M
  4FC8       DF F4             STX F4      M
  4FCA       08                INX
  4FCB       DF B5             STX B5      M-
```

Table 1 continued

```
ADDRESS   M-L INSTRUCTION   ASSEMBLY INSTRUCTION

 4FCD        CE 40 00          LDX #4000   M
 4FD0        DF B7             STX B7      M-
 4FD2        A6 00             LDA A 0,X
 4FD4        2B 22             BMI 4FF8
 4FD6        81 40             CMP A #40
 4FD8        25 06             BLO 4FE0
 4FDA        81 60             CMP A #60
 4FDC        25 04             BLO 4FE2
 4FDE        8B 60             ADD A #60
 4FE0        8B 60             ADD A #60
 4FE2        DE B5             LDX B5      M-
 4FE4        A7 00             STA A 0,X
 4FE6        08                INX
 4FE7        DF B5             STX B5      M-
 4FE9        DE B7             LDX B7      M-
 4FEB        08                INX
 4FEC        BC 42 80          CPX 4280    M
 4FEF        26 DF             BNE 4FD0
 4FF1        DE B5             LDX B5      M-
 4FF3        6F 00             CLR 0,X
 4FF5        7E E2 86          JMP E286    M-
 4FF8        F6 42 82          LDA B 4282 M-
 4FFB        C4 70             AND B #70
 4FFD        1B                ABA
 4FFE        20 E2             BRA 4FE2
```

Table 2

```
ADDRESS   M-L INSTRUCTION   ASSEMBLY INSTRUCTION

 0F13        30 8C 0F          LEAX 0F,PC
 0F16        BF 01 8F          STX 018F     MJ
 0F19        86 7E             LDA #7E
 0F1B        B7 01 8E          STA 018E     MJ
 0F1E        30 8C 1C          LEAX 1C,PC
 0F21        BF 01 80          STX 0180     MJ
 0F24        39                RTS
 0F25        9D A5             JSR A5       MJ
 0F27        81 65             CMPA #65
 0F29        26 F9             BNE 0F24
 0F2B        7A 01 1A          DEC 011A     MJ
 0F2E        BD A9 28          JSR A928     MA
 0F31        86 7E             LDA #7E
 0F33        B7 01 7F          STA 017F     MJ
 0F36        0F 3B             CLR 3B       M-
 0F38        9D 9F             JSR 9F       MJ
 0F3A        7E B7 64          JMP B764     MA
 0F3D        0D 3B             TST 3B       M-
 0F3F        26 11             BNE 0F52
 0F41        0C 3B             INC 3B       M-
 0F43        EC 02             LDD 2,X
 0F45        10 93 2B          CMPD 2B      M-
 0F48        27 01             BEQ 0F4B
 0F4A        86 39             LDA #39
 0F4C        B7 01 7F          STA 017F
 0F4F        7E AC 73          JMP AC73     MA
 0F52        86 39             LDA #39
 0F54        B7 01 7F          STA 017F     MJ
 0F57        8E 04 00          LDX #0400    MJ
 0F5A        9F 88             STX 88       MJ
 0F5C        A6 84             LDA ,X
 0F5E        97 2C             STA 2C       M-
 0F60        BD A1 B1          JSR A1B1     MA
 0F63        81 09             CMPA #9
 0F65        26 12             BNE 0F79
 0F67        8D 09             BSR 0F72
```

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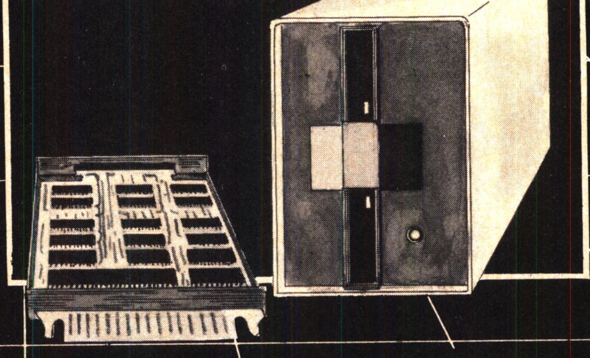

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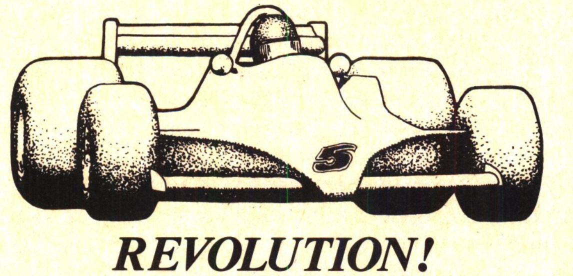
```
ADDRESS  M-L INSTRUCTION  ASSEMBLY INSTRUCTION

0F69        8C 04 FC          CMPX #04FC  MJ
0F6C        24 F2             BCC 0F60
0F6E        30 01             LEAX 1,X
0F70        20 E8             BRA 0F5A
0F72        9E 88             LDX 88      MJ
0F74        96 2C             LDA 2C      M-
0F76        A7 84             STA ,X
0F78        39                RTS
0F79        81 0C             CMPA #0C
0F7B        26 11             BNE 0F8E
0F7D        9E 88             LDX 88      MJ
0F7F        8C 04 FD          CMPX #04FD  MJ
0F82        24 06             BCC 0F8A
0F84        A6 01             LDA 1,X
0F86        A7 80             STA ,X+
0F88        20 F5             BRA 0F7F
0F8A        9E 88             LDX 88      MJ
0F8C        20 CE             BRA 0F5C
0F8E        81 0A             CMPA #0A
0F90        26 0C             BNE 0F9E
0F92        8D DE             BSR 0F72
0F94        8C 04 DD          CMPX #04DD  MJ
0F97        24 C7             BCC 0F60
0F99        30 88 20          LEAX 20,X
0F9C        20 BC             BRA 0F5A
0F9E        81 08             CMPA #8
0FA0        26 0B             BNE 0FAD
0FA2        8D CE             BSR 0F72
0FA4        8C 04 00          CMPX #0400  MJ
0FA7        27 B7             BEQ 0F60
0FA9        30 1F             LEAX -1,X
0FAB        20 AD             BRA 0F5A
0FAD        81 13             CMPA #13
0FAF        26 15             BNE 0FC6
0FB1        8E 04 FC          LDX #04FC   MJ
0FB4        9C 88             CMPX 88     MJ
```

```
ADDRESS  M-L INSTRUCTION  ASSEMBLY INSTRUCTION

0FB6        27 06             BEQ 0FBE
0FB8        A6 82             LDA ,-X
0FBA        A7 01             STA 1,X
0FBC        20 F6             BRA 0FB4
0FBE        96 2C             LDA 2C      M-
0FC0        A7 01             STA 1,X
0FC2        86 60             LDA #60
0FC4        20 98             BRA 0F5E
0FC6        81 03             CMPA #3
0FC8        27 85             BEQ 0F4F
0FCA        81 0D             CMPA #0D
0FCC        27 0C             BEQ 0FDA
0FCE        BD A2 85          JSR A285    MA
0FD1        8C 04 FC          CMPX #04FC  MJ
0FD4        27 02             BEQ 0FD8
0FD6        30 01             LEAX 1,X
0FD8        20 96             BRA 0F70
0FDA        8E 02 DC          LDX #02DC   MJ
0FDD        9F A6             STX A6      MJ
0FDF        30 01             LEAX 1,X
0FE1        CE 04 00          LDU #0400   MJ
0FE4        A6 C0             LDA ,U+
0FE6        2B 0C             BMI 0FF4
0FE8        81 40             CMPA #40
0FEA        25 06             BLO 0FF2
0FEC        81 60             CMPA #60
0FEE        25 04             BLO 0FF4
0FF0        8B 60             ADDA #60
0FF2        8B 60             ADDA #60
0FF4        A7 80             STA ,X+
0FF6        11 93 88          CMPU 88     MJ
0FF9        26 E9             BNE 0FE4
0FFB        6F 84             CLR ,X
0FFD        7E AC 8E          JMP AC8E    M-
```

SOFTWARE FOR THE TRS-80* COLOR COMPUTER!



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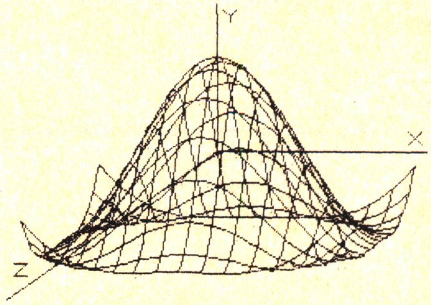

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rative form will be given. Augmenting this description will be references to the "MC-10 Memory Map" (see the January, 1984 issue of *the Rainbow* and to the "Color Computer Memory Map" (July and August, 1983 issues). In Table 1 those references are made by the appearance of the letter M at the right of each assembly language instruction that uses a BASIC ROM routine or a BASIC system location or locations described in "MC-10 Memory Map." In Table 2 the references are made similarly using the letters MJ and MA where J and A designate July and August, respectively. The notation, M-, is used in both tables to indicate that the instruction employs a BASIC system location not described in the memory map articles. The use of the M, MJ, and MA notation effectively supplies the detailed description where it is needed most.

In the narrative that follows when two different sets of addresses are referred to together, one set will be enclosed in parentheses. The enclosed set will be associated with the CoCo and the other set of addresses with the MC-10.

The *EXEC* command entry to the *e* command program is 4EF6 (0F13). Ordinarily, using a lowercase letter as a BASIC command will result in an SN Error. The routine at addresses 4EF6-4F07 (0F13-0F24) provides the means of bypassing the ROM's error processing routine when *e* is issued as a command. The routine also begins the process of preventing the *LIST* command from returning to BASIC upon its completion. The *LIST* command is employed by the *e* command program to display the specified line of BASIC programming.

The routine at 4F08-4F22 (0F25-0F3C) is entered when the BASIC interpreter detects any error. If the error is *not* the result of issuing *e* as a command, the routine is terminated with a return to BASIC's error processing routine. Otherwise, the routine switches from the upper-/lowercase mode to all capitals. It clears the screen and completes the process of changing the *LIST* command sequence. Finally, the *LIST* command routine is initiated.

The *LIST* command sequence reaches the routine at 4F2B-4F40 (0F3D-0F51) twice. During the first time the routine checks to see whether the specified line number is valid. If the line is not valid, the routine prevents a second entry and then finishes the *e* command prematurely by returning immediately to BASIC. However, if the line number is found to be valid, a return is made to the *LIST* command sequence. The second time through the routine results in a jump to the routine at addresses 4F41-4F56 (0F52-0F66).

The latter routine initializes the cursor to the top left position of the screen and saves the character at that position. Finally, it waits for and acts upon the next key you press.

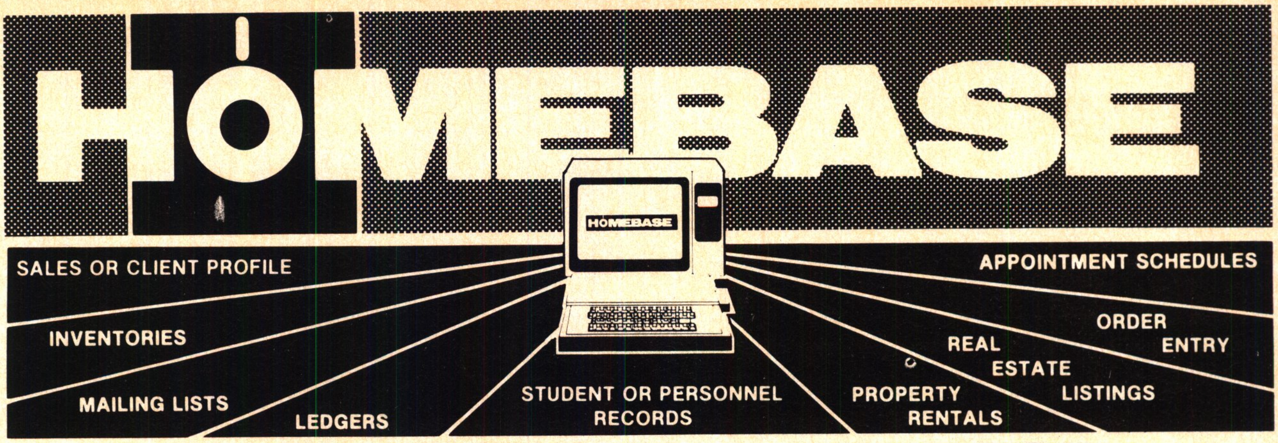
The routine at 4F57-4F60 (0F67-0F71) moves the cursor right one position when the right arrow key has been pressed.

At the addresses 4F65-4F78 (0F7D-0F8D) is the routine that deletes a character when you press the MC-10 [L. DEL.] key or the CoCo [CLEAR] key.

The routine that moves the cursor one position down when you press the down arrow key is at addresses 4F7D-4F88 (0F92-0F9D).

The routine at 4F8D-4F96 (0FA2-0FAC) moves the cursor left one position when the [←] key is depressed.

When you press [SHIFT] [@], the routine at 4F9B-4FB1 (0FB1-0FC5) inserts a space into the line of BASIC programming.



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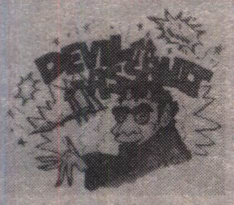

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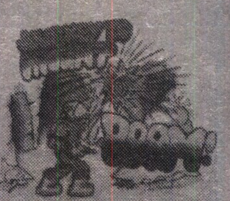

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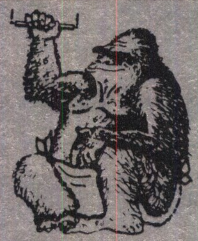

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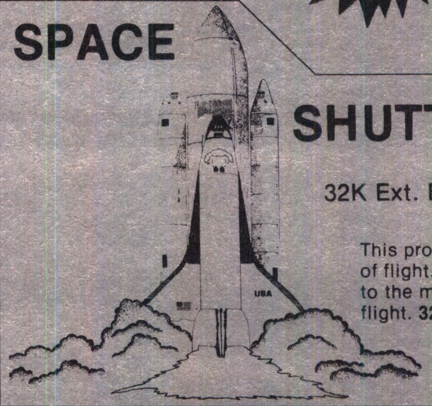

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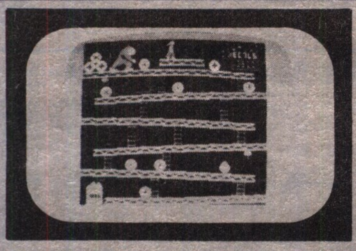
THE KING



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MATH DRILL is a program designed to help children to practice addition, subtraction, multiplication, and division skills on the COLOR COMPUTER. It has several features that make its use particularly attractive.

- Up to 6 students may use the program at the same time.
- Answers for addition, subtraction and multiplication are entered from right to left, just as they are written on paper.
- Commas may be included in the answers.
- Partial products for the multiplication problems may be computed on the screen.
- Division answers that have a remainder are entered as a whole number followed by the letter "R" and the remainder.
- There are ten, user modifiable, skill levels.
- A "SMILEY FACE" is used for motivation and reward. Its size increases relative to the skill level.
- Skill levels automatically adjust to the student's ability.
- A timer measures the time used to answer each problem and the total time used for a series of problems.
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ESTIMATE is a program designed to help children to practice estimating the answers to addition, subtraction, multiplication and division problems on the COLOR COMPUTER. It has many features that make its use particularly attractive:

- Up to 5 students may use the program at the same time.
- There are 5, user modifiable, skill levels.
- The acceptable percent error may be changed as a student's skill improves.
- A timer measures the number of seconds used to answer each problem and the total time used for a series of problems.
- If a problem has been answered incorrectly, the student is told the percent error and asked to try again.
- If a problem is answered incorrectly a second time, the student is told the correct answer and the range of acceptable answers is displayed.
- A report is given at the end of each set of problems that includes the number of problems done, the number of problems answered correctly on the first try and the average percent error.
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TEACHERS' DATABASE is a program designed to allow a teacher to keep a computerized file of information about his/her students. There are many features that make this program particularly attractive.

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- Each student may have as many as 20 (or more) individual items of data in his/her record.
- The program will run from cassette or disk.
- Cassette and disk files are completely compatable.
- The program is menu driven.
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At 4FB2-4FB5 (0FC6-0FC9) is the routine that allows you to break out of the *e* command by pressing the [BREAK] key.

The routine that prints the character you type is located at addresses 4FBA-4FC4 (0FCE-0FD9).

The pressing of the [ENTER] key causes a jump to the routine at 4FC5-4FFF (0FDA-0FFF). That routine translates and transfers the information displayed on the screen to the INPUT buffer area of the BASIC interpreter. The *e* command program is completed by jumping to the ROM routine that tokenizes BASIC command words and inserts the specified line into the BASIC program.

```
160..............101
320...............80
END................7
```

MC-10
Listing 1

```
10 CLS:X=256*PEEK(16976)-11
20 CLEAR25,X
30 X=256*PEEK(16976)-10
40 FORZ=X TOX+265
50 READY:W=W+Y:PRINTZ,Y;W
60 POKEZ,Y:NEXT
70 IFW<>29479THENPRINT"DATA ERRO
R":STOP
80 EXECX:END
90 DATA 198,18,58,255,66,152,134
100 DATA 126,183,66,151,198,35
110 DATA 58,255,66,170,57,189,0
120 DATA 243,129,101,38,248,122
130 DATA 66,28,189,251,212,134
140 DATA 126,183,66,169,127,0
150 DATA 181,189,0,235,126,228
160 DATA 13,254,66,128,150,166
170 DATA 167,0,57,125,0,181,38
180 DATA 17,124,0,181,236,2,147
190 DATA 165,39,1,134,57,183,66
200 DATA 169,126,226,113,134,57
210 DATA 183,66,169,206,64,0,255
220 DATA 66,128,166,0,151,166
230 DATA 189,248,104,129,9,38,10
240 DATA 141,202,140,64,127,36
250 DATA 242,8,32,232,129,21,38
260 DATA 20,254,66,128,140,64
270 DATA 128,36,7,166,1,167,0,8
280 DATA 32,244,254,66,128,32
290 DATA 211,129,10,38,12,141
300 DATA 164,140,64,96,36,204
310 DATA 198,32,58,32,192,129,8
320 DATA 38,10,141,148,140,64,0
330 DATA 39,188,9,32,178,129,19
340 DATA 38,23,206,64,127,188
350 DATA 66,128,39,7,9,166,0,167
360 DATA 1,32,244,150,166,167,1
370 DATA 134,96,32,156,129,3,39
380 DATA 136,129,13,39,11,189
```

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```
390 DATA 249,201,140,64,127,39,1
400 DATA 8,32,154,206,66,177,223
410 DATA 244,8,223,181,206,64,0
420 DATA 223,183,166,0,43,34,129
430 DATA 64,37,6,129,96,37,4,139
```

150 190
300 90
END 81

CoCo
Listing 2

```
10 CLS:X=256*PEEK(35)+18
20 CLEAR25,X
30 X=256*PEEK(35)+19
40 FORZ=X TOX+236
50 READY:W=W+Y:PRINTZ,Y;W
60 POKEZ,Y:NEXT
70 IFW<>23170THENPRINT"DATA ERRO
R":STOP
80 EXECX:END
90 DATA 48,140,15,191,1,143,134
100 DATA 126,183,1,142,48,140,28
110 DATA 191,1,128,57,157,165
120 DATA 129,101,38,249,122,1,26
130 DATA 189,169,40,134,126,183
140 DATA 1,127,15,59,157,159
150 DATA 126,183,100,13,59,38,17
160 DATA 12,59,236,2,16,147,43
170 DATA 39,1,134,57,183,1,127
180 DATA 126,172,115,134,57,183
190 DATA 1,127,142,4,0,159,136
200 DATA 166,132,151,44,189,161
210 DATA 177,129,9,38,18,141,9
220 DATA 140,4,252,36,242,48,1
230 DATA 32,232,158,136,150,44
240 DATA 167,132,57,129,12,38,17
250 DATA 158,136,140,4,253,36,6
260 DATA 166,1,167,128,32,245
270 DATA 158,136,32,206,129,10
280 DATA 38,12,141,222,140,4
290 DATA 221,36,199,48,136,32
300 DATA 32,188,129,8,38,11,141
310 DATA 206,140,4,0,39,183,48
320 DATA 31,32,173,129,19,38,21
330 DATA 142,4,252,156,136,39,6
340 DATA 166,130,167,1,32,246
350 DATA 150,44,167,1,134,96,32
360 DATA 152,129,3,39,133,129,13
370 DATA 39,12,189,162,133,140,4
380 DATA 252,39,2,48,1,32,150
390 DATA 142,2,220,159,166,48,1
400 DATA 206,4,0,166,192,43,12
410 DATA 129,64,37,6,129,96,37
420 DATA 4,139,96,139,96,167
430 DATA 128,17,147,136,38,233
440 DATA 111,132,126,172,142
```

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TAKING BASIC TRAINING 16K ECB

Program Appending For Fun and Profit

By Joseph Kolar
***Rainbow* Contributing Editor**

Recently, you considered how to append programs. This is a very important skill that you will utilize on innumerable occasions.

So, what do you say to a little practice session? What do you say to having some fun experimenting and do enough appending so that it will be reinforced as a skill that will be a part of our repertoire of useful programming tools?

We will create a nonsense program step by step. Put a blank cassette in your recorder and if you have Extended Color BASIC, read on! Use the appropriate *POKE* and *PEEK* values if you have Color BASIC when using your append routine. Did you make a reference card? The ECB values will be used in the following demonstration.

You have a choice of using either the *NUMBERS* listing or the *COLORS* listing. The demo will use *NUMBERS* because that is the kind of material you are going to append in reality. However, since you have a Color Computer, why not use a bit of color?

Key in either the *NUMBERS* listing or the alternate listing, *COLORS*.

```
CSAVE“NUMBERS”
DEL 100-150
RENUM 100,160,10 LIST
CSAVE“N1” LIST NEW
CLOAD“NUMBERS” LIST
DEL 100-120
DEL 160-180
RENUM 100,130,10 LIST
CSAVE“N2” LIST NEW
CLOAD“NUMBERS” LIST
DEL 130-180 LIST
CSAVE“N3” LIST
```

It is not necessary to *CSAVE“N3”* in this case. You may wonder why save it, if you don't have to? The more you get into programming, the more you have a tendency to save all your original work to keep all bases covered. The demo routine suggests how you might stop in the middle of a creative session at the keyboard, save your results to the moment on a temporary storage tape and later on return to work knowing that none of your work has to be repeated because you have copies of everything. This is an easy, almost effortless procedure to follow. It eliminates the frustration of loss of much creative effort in the event you accidentally zap your program or if you are shut down by an electrical outage.

Note the countless *LISTs* in the above and also the following procedures. They are added, not to insult your intelligence, but as pointers to cause you to pause and look over your handiwork. Always a good practice! Especially when there is a tendency to race onward in a frenzy of creative activity. (Another cute way of saying haste makes waste.)

Back to the drawing board! You still have *N3* in memory.

```
POKE25,PEEK(27)
POKE26,PEEK(28)-2
CLOAD“N2”
POKE25,30 POKE26,1 LIST
POKE25,PEEK(27)
POKE26,PEEK(28)-2
CLOAD“N1”
POKE25,30 POKE 26,1LIST
```

If you are using the *NUMBERS* listing, add the following two lines:

```
1 PMODE4,1:PCLS:SCREEN1,0
2000 DRAW“s8BM110,100”+L3$+L6$+L9$
```

(Joseph Kolar is a free-lance writer and programmer dedicated to proselytizing for computers in general, and the CoCo specifically.)

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If you'd rather use the *COLORS* listing, then add these two lines:

```
1 CLS
2000 PRINT@268,a$+b$+c$+d$+e$+f$+g$+h$+i$
```

In either case, add:

```
3000 GOTO 3000 RUN BREAK LIST
CSAVE"RESULT" LIST
DEL 1-120
RENUM 100,2000,10 LIST
CSAVE "REVISED" NEW
CLOAD "RESULT" LIST
DEL 2000-
POKE25,PEEK(27)
POKE26,PEEK(28)-2
CLOAD "REVISED"
POKE25,30 POKE26,1 RUN BREAK LIST
CSAVE "FINAL" RUN BREAK LIST
DEL 1 LIST
CSAVE "BALANCE" NEW
```

Key in the following line:

```
100 PMODE4,1:PCLS:SCREEN 1,0
POKE25,PEEK(27)
POKE26,PEEK(28)-2
CLOAD "BALANCE"
POKE25,30 POKE26,1 RUN BREAK LIST
CSAVE "NONSENSE"
```

Note that once you get more than 14 lines of print on the screen, even your game-sharpened hand is not quick enough to [SHIFT] [@] to stop the listing as you list it to catch the beginning of the listing.

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Try LIST-120 and note the result. Try LIST-110. Try either LIST 100 or LIST-100.

Question! What lines can you edit when you call a particular line with an EDIT command? Try it and see!

Suppose you had an error in line 120 (the line 120 containing L6$ or F$, as the case may be). How could you correct it? Fool around!

What comes to mind is merely to *RENUM 100,100,10.* Now the result is a regular, run of the mill program. Note that it will run even though you have 210 GOTO 120.

Why? If you have ECB and use *TRON*, you will observe that in this simple, straightforward program, an infinite loop is created. If you used any line number except 100, you would get the same satisfactory result.

Now, try 210 GOTO 100. Whoops! Well, if you want it flashing, you got it! What happened?

I'll leave you to experiment further. You can see where this program is heading; only line 100s! If you have the time or inclination, you might want to try it. One cautionary! Keep all your *GOTOs* at the end of the program. So long as it is a simple, linear program, it can be done. Ah, puzzles!

The big question is — "Did we learn anything?" Sure! We taught ourselves how to take selected segments of a program, extract parts and renumber them, to save and have them ready to append to another program. We did enough appending to feel confident to use this procedure.

A listing with all line 100s was not included in this article because if you keyed it in, it wouldn't work. Since there is more than one way to skin a cat, can you think of another way to duplicate *NONSENSE*?

From what you learned in this session, how would you go about changing line 110 GOTO 110 to 100 GOTO 100? Try to make this program contain only line 100s. If you fail to puzzle it out and simply must have the answer, drop a postal card to my home address and I'll send you a solution — but you should be able to figure it out. My address is 1709 Dickinson St. Inverness, FL 32650.

Experimentation may lead to a dead end, as it often does, but the learning process goes on. We had fun fooling around and got a lot of appending under our belts. At worst, you can always show your listing of *NONSENSE* to other beginners and flabbergast them by calling an oddly, and I mean oddly, numbered program that will run.

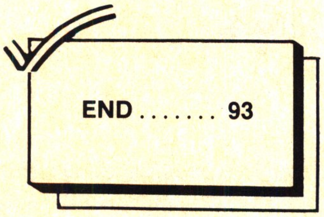
Finally, we proved that the newcomer to computing can have a lot of light-hearted relaxation and recreation with his trusty CoCo.

Listing 1:

```
0 ' <NUMBERS> LISTING1
100 L1$="BRU6NGBD6BR3"
110 L2$="BU6R3FD2GL3D2R4BR3"
120 L3$="BU6R3FDGNL2FDGNL3BR4"
130 L4$="BU6D4R3NU4NRD2BR4"
140 L5$="R3EU2HL3U2R4BD6BR3"
150 L6$="BUNUFR2EUHL2GU3ER2FBD5B
R3"
160 L7$="BU6R4D3GD2BR4"
170 L8$="BRHUEHUER2FDGNL2FDGNL2B
R4"
180 L9$="BUFR2EU4HL2GDFR2EBD4BR3
"
```

Listing 2:

```
0 '<COLORS> ALTERNATE LISTING
100 A$=CHR$(128)
110 B$=CHR$(143)
120 C$=CHR$(159)
130 D$=CHR$(175)
140 E$=CHR$(191)
150 F$=CHR$(207)
160 G$=CHR$(223)
170 H$=CHR$(239)
180 I$=CHR$(255)
```



Listing 3:

```
1 'EVIL-EYE
2 PRINT:PRINTTAB(12)"EVIL EYE"
3 PRINT TAB(10)"JOSEPH KOLAR"
4 PRINT TAB(7)"INVERNESS, FLORID
A"
5 PRINT:PRINT"  HERE IS A LITTLE
 DESIGN THAT  YOU ARE INVITED TO
 ALTER AND SEEWHAT YOU CAN COME
UP WITH!
                TRY CHANGING THE
 VARIABLES,   THE LOCATIONS OR T
HE SIZES.  ADDOR DROP ROUTINES.
 YOU ARE THE  BOSS!
6 PRINT:PRINT"          PRESS <EN
TER>";:INPUT T
10 PMODE 4,1:PCLS:SCREEN 1,1
20 FOR Y=.1 TO .05 STEP-.05
30 FOR X= 1 TO .5 STEP- Y
40 CIRCLE(120,96),20,1,X
50 CIRCLE(137,96),20,1,X
60 CIRCLE(128,96),30,1,Y*3
70 NEXT X,Y
100 FOR Y= .05 TO .1 STEP .05
110 FOR X=1 TO .5 STEP-Y
120 CIRCLE(120,96),20,2,X
130 CIRCLE(137,96),20,2,X
140 NEXT X,Y
200 FOR Y= 1 TO .2 STEP-.1
210 CIRCLE (128,30),15,1,Y
220 NEXT Y
300 FOR Y= 1 TO .2 STEP-.1
310 CIRCLE(128,160),15,1,Y
320 NEXT Y
400 FOR Y=1 TO .2 STEP-.1
410 CIRCLE(40,96),15,1,Y
420 CIRCLE(215,96),15,1,Y
430 NEXT Y
1000 GOTO 20
```

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MoCalc — MiniCalc Gets A Big Brother

By Barry Spencer

The electronic spreadsheet has become a software staple for most home and business microcomputer users. It seems that every serious user needs a spreadsheet program as well as a word processor and a filing or data management system. *MoCalc* gives you the opportunity to add a useful spreadsheet program to your software repertoire.

MoCalc is big brother to the *MiniCalc* program that appeared in the October 1982 issue of *the Rainbow*. It is basically the same program that Jim Ebbert wrote, with some features added to make it mo' versatile and mo' powerful.

Features and improvements of the spreadsheet program include:

- — increase of maximum size from 3 x 13 to 9 x 43.
- — disk capability is added to save/load functions.
- — multiple cell entries are more convenient using the new four-way cursor control.
- — a print routine allows the full spreadsheet to be printed on printers with a width of 80 characters.
- — a function view command allows you to inspect the function or formula assigned to any cell. (This is non-destructive.)
- — column and row addition functions are featured as well as the previously available +, -, *, /, ∧, integer, and absolute functions.
- — 16 different but overlapping areas of the spreadsheet can be displayed using the four move commands that are part of *MoCalc*.

Let's define some terms before we dive into the program operation.

Cell — a location on the spreadsheet that is defined by a row number and a column number. Columns are vertical, rows horizontal. The column numbers appear across the top of the display, row numbers along the left side. When explaining general operations, x will be used to represent a column number, y the row number. Each cell is capable of displaying a maximum of eight numbers.

Command — a series of alphanumeric characters used to initiate a specific routine in the spreadsheet program. The valid commands (separated by a slash) are: Gx,y/Fx,y/Vx,y/MD/MU/ML/MR/S/L/U/P.

Function — a mathematical function or formula assigned to a specific cell. The function is used to calculate the value of the number displayed in the cell.

Commands — can be entered whenever the command prompt (>) appears in the upper left-hand corner of the screen.

The cell entry command syntax is: Gx,y [ENTER]. A cursor appears in the cell location addressed. Enter a maximum of eight characters using the [←] key to correct mistakes. Be forwarned, do not use more than eight characters (I know it's tempting! But are you willing to pay the consequences?) You can place the cell data in memory and return to the command prompt by depressing [ENTER] or if you wish to continue making cell entries you may depress up arrow, down arrow, right arrow, or shift left arrow to move the cursor to an adjacent cell. Only cells on the display can be entered by the cell entry command and/or use of the arrow keys. Note that when using the arrows to go to another cell, the contents of the cell as stored in memory are replaced by what is in the cell when you hit an arrow key or [ENTER]. In other words, cursor movement in the cell entry command is destructive.

Hints: In addition to the obvious entering of numbers, the cell entry command can be used to enter column and row headings. Eight hyphens in a cell work well to show the end of a column of numbers to be added. Eight equal signs work well when placed below a total to represent that all important bottom line.

The function entry syntax is: Fx,y [ENTER]. An orange prompt appears at the cell location x,y. A blinking prompt occurs in the upper left-hand corner. Use the keyboard to enter the function or formula for the cell. The function appears on the upper portion of the screen as you type. Use

(Barry Spencer is a supervisor and editor in a technical writing department for a major electronics corporation. He holds a master's degree in electrical engineering.)

NAME →

PERIOD	CHECK #	EARNINGS	FED W/H	STAT W/H	SOC SEC	NET PAY
MID JAN						R3,6
END JAN						R3,6
MID FEB						R3,6
END FEB						R3,6
MID MAR						R3,6
END MAR						R3,6
MID APR						R3,6
END APR						R3,6
MID MAY						R3,6
END MAY						R3,6
MID JUNE						R3,6
END JUNE						R3,6
MID JULY						R3,6
END JULY						R3,6
MID AUG						R3,6
END AUG						R3,6
MID SEPT						R3,6
END SEPT						R3,6
MID OCT						R3,6
END OCT						R3,6
MID NOV						R3,6
END NOV						R3,6
MID DEC						R3,6
END DEC						R3,6
1ST QTR	TOTALS→	C4,9	C4,9	C4,9	C4,9	C4,9
2ND QTR	TOTALS→	C10,15	C10,15	C10,15	C10,15	C10,15
3RD QTR	TOTALS→	C16,21	C16,21	C16,21	C16,21	C16,21
4TH QTR	TOTALS→	C22,27	C22,27	C22,27	C22,27	C22,27
		-------------	------------	------------	------------	------------
YEAR	TOTALS→	C30,36	C30,36	C30,36	C30,36	C30,36

Sample 1. Cell Entries and Formulas for Payroll Shell

NAME → REV ROBT DOE

PERIOD	CHECK #	EARNINGS	FED W/H	STAT W/H	SOC SEC	NET PAY
MID JAN	1001	400	-100	-4	-6	290
END JAN	1008	500	-120	-5	-7	368
MID FEB	1022	400	-100	-4	-6	290
END FEB	1030	500	-120	-5	-7	368
MID MAR	1044	400	-100	-4	-6	290
END MAR	1056	500	-120	-5	-7	368
MID APR	1080	400	-100	-4	-6	290
END APR	1099	500	-120	-5	-7	368
MID MAY	1118	400	-100	-4	-6	290
END MAY	1123	500	-120	-5	-7	368
MID JUNE	1144	400	-100	-4	-6	290
END JUNE	1160	500	-120	-5	-7	368
MID JULY	1171	400	-100	-4	-6	290
END JULY	1179	500	-120	-5	-7	368
MID AUG	1189	400	-100	-4	-6	290
END AUG	1201	500	-120	-5	-7	368
MID SEPT	1222	400	-100	-4	-6	290
END SEPT	1231	500	-120	-5	-7	368
MID OCT	1245	400	-100	-4	-6	290
END OCT	1254	500	-120	-5	-7	368
MID NOV	1260	400	-100	-4	-6	290
END NOV	1282	500	-120	-5	-7	368
MID DEC	1293	400	-100	-4	-6	290
END DEC	1302	500	-120	-5	-7	368
1ST QTR	TOTALS→	2700	-660	-27	-39	1974
2ND QTR	TOTALS→	2700	-660	-27	-39	1974
3RD QTR	TOTALS→	2700	-660	-27	-39	1974
4TH QTR	TOTALS→	2700	-660	-27	-39	1974
		-------------	------------	------------	------------	------------
YEAR	TOTALS→	10800	-2640	-108	-156	7896

Sample 2. Application of Payroll Shell

the left arrow to backspace. Avoid entering formulas more than two lines in length.

The following functions may be used:

- Ca,b gives the sum of values appearing in the column from row a to row b.
- Ra,b gives the sum of values appearing in a row from column a to column b.

In formulas the following operators may be used:

- mathematical operators +, -, *, /, ∧.
- the letter A at the front or end of a formula takes the absolute value of the result.
- the letter I at the front or end of a formula takes the integer value of the result.

In formulas, the following operands may be used: [x,y] a cell location with brackets represents the value in a cell location. A left bracket is entered with shift down arrow. A right bracket with shift right arrow. [a] a number (to be used as a constant in a calculation) must be enclosed by the less than and greater than symbols.

The function view syntax is: Vx,y[ENTER]. The function or formula is cell x,y is displayed on the second line of the screen. If the formula length is greater than one line, depress the right arrow to view the remainder of the formula. Depress [ENTER] to return to the command prompt.

The four move commands are MU (move up toward the top of the spreadsheet), MD (move down), MR (move right), ML (move left). The two letter command is followed by [ENTER]. The commands allow you to view sixteen 3 x 13 portions of the spreadsheet.

The save command is initiated with: S [ENTER]. This command saves the spreadsheet to tape or disk.

The load command is initiated with: L [ENTER]. This command loads a file from tape or disk into the computer memory.

The update command is initiated with: U [ENTER]. The value of cells containing formulas are calculated (or recalculated). Calculations take place from top to bottom so if a formula contains a reference to a cell below it, you must update two times.

The print command is initiated with: P [ENTER]. You are prompted for the starting and ending rows for printing. All columns are printed.

Command Summary

Description	**Syntax**	**Comment**
Cell Entry	Gx,y	Use arrow keys for multiple cell entries
Function Entry	Fx,y	Row and column addition +, -, *, /, △, I, A
Function View	Vx,y	Use right arrow for second line
Move Left	ML	
Move Right	MR	
Move Up	MU	
Move Down	MD	
Update	U	Performed top to bottom
Save to Tape/Disk	S	
Load from Tape/Disk	L	
Print	P	

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I have found *MoCalc* extremely useful for household record keeping and for doing bookkeeping for my church. I recently used the spreadsheet to prepare an itemized list of charitable deductions to be declared on my income tax return. I have also been using it to keep payroll records for church employees. I have included an example of how to use *MoCalc* for keeping payroll records. This example can give you a good idea of how useful *MoCalc* is and can show you how to apply the program features to the specific task of recording a payroll.

When you are planning to use a spreadsheet to do some record keeping, it is a good idea to prepare a "shell." A shell is a predesigned data display that contains column and row headings and formulas for a specific application or use. A good description of shells and their uses is contained in "Building Spectaculator Shells" by Robert W. Ericson in the April 1983 issue of *the Rainbow*.

> "It seems that every serious user needs a spreadsheet program as well as a word processor and a filing or data management system. *MoCalc* gives you the opportunity to add a useful spreadsheet program to your software repertoire."

Sample 1 shows a shell that was prepared for keeping payroll records. All of the row and column headings as well as the dashes and equal signs were entered using the cell entry command and the cursor keys. It is important to stress here that you must enter no more than eight characters in a cell. When the row heading 1ST QTR TOTALS→ was entered, two cell entries were required. The easiest way to do this is to enter 1ST QTR, [RIGHT ARROW], TOTAL→. You must hit [ENTER] or [RIGHT ARROW] after entering 1ST QTR.

While Sample 1 shows the functions as well as the headings, you do not see these functions on the screen display cells or on a printout of the shell. This is a special printout to show you the formulas and the cells into which they are inserted. You can however view the formulas you have entered using the function view command. In the NET PAY column the formula R3,6 appears for each pay period. R3,6 is a row addition function that calculates the sum of entries in the row from column 3 (EARNINGS) through column 6 (SOC SEC). Similarly, column functions are used to perform the TOTALS calculations at the bottom of the sheet. C4,9 calculates the sum of numbers in the column from rows 4 through 9. After the shell is created it should be saved to disk or tape.

Sample 2 shows how the shell can be used to maintain a payroll. I'll warn you one more time about cell entry. When entering the name REV ROBT DOE, I had to make two cell entries, because the name exceeds eight characters in length. Note the use of negative numbers for payroll deductions. All entries were made using the cell entry command. Calculations are made by using the update command.

200	38
350	244
480	44
680	221
910	60
1020	82
1200	152
END	220

The listing:

```
10 '****MOCALC****
20 'a spreadsheet program
30 'by BARRY SPENCER
35 'SCHAUMBURG, ILLINOIS
40 '
50 'based on
60 'MINICALC by JIM EBBERT in
70 'RAINBOW MAGAZINE OCTOBER 198
2
75 '                    4250
80 TROFF:PCLEAR1:CLEAR7000:DIML$
(9,43),V(40),I$(9,43)
90 CLS
100 FORT=1088TO1119:POKET,32:NEX
T:POKE1101,50:POKE1111,51:POKE10
91,49:PRINT@96,"";
110 FORT=1TO12:PRINTRIGHT$(STR$(
T),2):NEXT
120 PRINT"13";
130 FORT=1121TO1506STEP32:P=PEEK
(T):IFP>63THENPOKET,P-64
140 NEXT:FORT=1120TO1505STEP32:P
=PEEK(T):IFP>63THENPOKET,P-64
150 NEXT
160 XS=0:YS=0
170 PRINT@0,">":PRINT:P=2:A$="":
C$="":PRINT@P,"";
180 A$=INKEY$:IFA$=""THENPRINT@P
,CHR$(255);:GOTO180
190 PRINT@P,CHR$(32);:IFA$=CHR$(
13)THEN230
200 IFA$=CHR$(8) AND LEN(C$)>0TH
ENP=P-1:C$=LEFT$(C$,P-2):GOTO180
210 C$=C$+A$
220 PRINT@P,A$;:P=P+1:GOTO180
230 L$=LEFT$(C$,1)
240 IFL$="G"THENF=0:GOTO330
250 IFL$="F"THENF=1:GOTO330
260 IFL$="V" THEN F=2:GOTO 330
270 IFL$="U"THEN940
280 IFL$="S"THEN970
290 IFL$="L"THEN1060
300 IFL$="M" THEN1170
310 IFL$="P" GOSUB 1320
320 GOTO 170
330 L$="":FORT=2TO LEN(C$):M$=MI
D$(C$,T,1):IFM$=","THEN360
340 L$=L$+M$
```

```
350 NEXT:GOTO170
360 L$=RIGHT$(L$,1):X=VAL(L$)-XS
:IFX+XS>9THEN170
370 L$=RIGHT$(C$,LEN(C$)-T)
380 Y=VAL(L$)-YS:IFY>14THEN170
390 IF F<>2 GOTO 430
400 IF LEN(I$(X+XS,Y+YS))=0 GOTO
 170 ELSE I1=1
410 PRINT@32,STRING$(32,32);:PRI
NT@32,MID$(I$(X+XS,Y+YS),1+32*(I
1-1),32);
420 I1$=INKEY$:IF I1$="" GOTO 42
0 ELSE IF LEN(I$(X+XS,Y+YS))>32*
I1 THEN I1=I1+1:GOTO 410 ELSE GO
TO 170
430 IF X<1 OR X>3 OR Y<1 OR Y>13
 THEN 170 ELSE PRINT@32,STRING$(
32,32);
440 P=Y*32+X*10+57:PRINT@P,"
    ";::L$(X+XS,Y+YS)="":IFF=1TH
ENGOSUB510:GOTO170
450 A$=INKEY$:IFA$=""THENPRINT@P
, CHR$(255);:GOTO450
460 PRINT@P," ";:IFA$=CHR$(13)TH
EN500 ELSE IF A$=CHR$(10) THEN Y
=Y+1: GOTO 430 ELSE IF A$=CHR$(9
) THEN X=X+1:GOTO 430
470 IF A$=CHR$(94) THEN Y=Y-1:GO
TO 430 ELSE IF A$=CHR$(21) THEN
X=X-1:GOTO 430
480 IFA$=CHR$(8) AND LEN(L$(X+XS
,Y+YS))>0THENP=P-1:L$(X+XS,Y+YS)
=LEFT$(L$(X+XS,Y+YS),LEN(L$(X+XS
,Y+YS))-1):GOTO450
490 L$(X+XS,Y+YS)=L$(X+XS,Y+YS)+
A$:PRINT@P,A$;:P=P+1:IF P=511 GO
TO170 ELSE GOTO450
500 GOTO170
510 PRINT@P,CHR$(255);
520 PRINT@0,I$(X+XS,Y+YS)
530 PRINT@0,"";:LINEINPUTI$:GOSU
B1150:O=0:I$(X+XS,Y+YS)=I$:XA=X+
XS:YA=Y+YS
540 O=0:V(0)=0:FORT=1TO LEN(I$)
550 M$=MID$(I$,T,1)
560 IFM$="["THENX$="":Y$="":GOTO
880
570 IFM$="<"THENX$="":Y$="":GOTO
1110
580 IF M$="R" GOTO 750
590 IFM$="C" GOTO 750
600 NEXT
610 I=0:V=V(0):O=1:FORT=1TO LEN(
I$)
620 M$=MID$(I$,T,1)
630 IFM$="*"THENV=V*V(O):GOTO930
640 IFM$="+"THENV=V+V(O):GOTO930
650 IFM$="/"THENV=V/V(O):GOTO930
660 IFM$="-"THENV=V-V(O):GOTO930
670 IFM$="I"THENI=I+1
680 IFM$="A"THENI=I+2
690 IFM$="^"THENV=V^V(O):GOTO930
700 NEXT
710 IFI=1THEN V=INT(V)
720 IFI=2THEN V=ABS(V)
730 IFI=3THEN V=INT(ABS(V))
740 GOTO 860
750 FOR T=2 TO LEN(I$)
760 IF MID$(I$,T,1)="," THEN T1$
=MID$(I$,2,T-2):LL=LEN(I$)-T:T2$
=MID$(I$,T+1,LL):GOTO780
770 NEXT T
780 V=0
790 IFM$="C" GOTO 830
800 FOR T=VAL(T1$) TO VAL(T2$)
810 V=V+VAL(L$(T,YA))
820 NEXT T:GOTO860
830 FOR T=VAL(T1$) TO VAL(T2$)
840 V=V+VAL(L$(XA,T))
850 NEXT T
860 PRINT@P-1,"         ";:PRINT
@P,V;:L$(XA,YA)=STR$(V):IF LEFT$
(L$(XA,YA),1)=" " THEN L$(XA,YA)
=RIGHT$(L$(XA,YA),LEN(L$(XA,YA))
-1)
870 RETURN
880 T=T+1:M$=MID$(I$,T,1):IFM$="
,"THEN900
890 X$=X$+M$:GOTO880
900 T=T+1:M$=MID$(I$,T,1):IFM$="
]"THEN920
910 Y$=Y$+M$:GOTO900
920 X1=VAL(X$):Y1=VAL(Y$):V(O)=V
AL(L$(X1,Y1)):O=O+1:GOTO600
930 O=O+1:NEXT:GOTO170
940 FORY=1TO43:FORX=1TO9:IFI$(X,
Y)=""THEN960
950 I$=I$(X,Y):X$="":Y$="":XA=X:
YA=Y:GOSUB540
960 NEXTX,Y:GOSUB 1240:FORO=98TO
480STEP32:PRINT@O,STRING$(30,32)
;:NEXT:PRINT@482,STRING$(29,32);
:POKE1535,96:FORX=1TO3:FORY=1TO1
3:PRINT@Y*32+X*10+57,L$(X+XS,Y+Y
S);:NEXTY,X:GOTO170
970 RF=0:INPUT "TAPE OR DISK (T/
D)";BB$:IF BB$="T" THEN AA=-1:GO
TO 1000 ELSE IF BB$="D" THEN AA=
1 ELSE GOTO 970
980 PRINT@0," ";: INPUT "NEW FIL
E OR REPLACE EXISTING    FILE(N/
R)";BB$:IF BB$="N" THEN PRINT@0,
"

                     ";:PRINT@0,"";:I
NPUT "FILENAME";NA$:TA$=NA$:GOTO
 1010
990 NA$=TA$:TA$="TEMP":RF=1:GOTO
 1010
1000 INPUT "FILENAME";TA$
1010 OPEN "O",#AA,TA$
```

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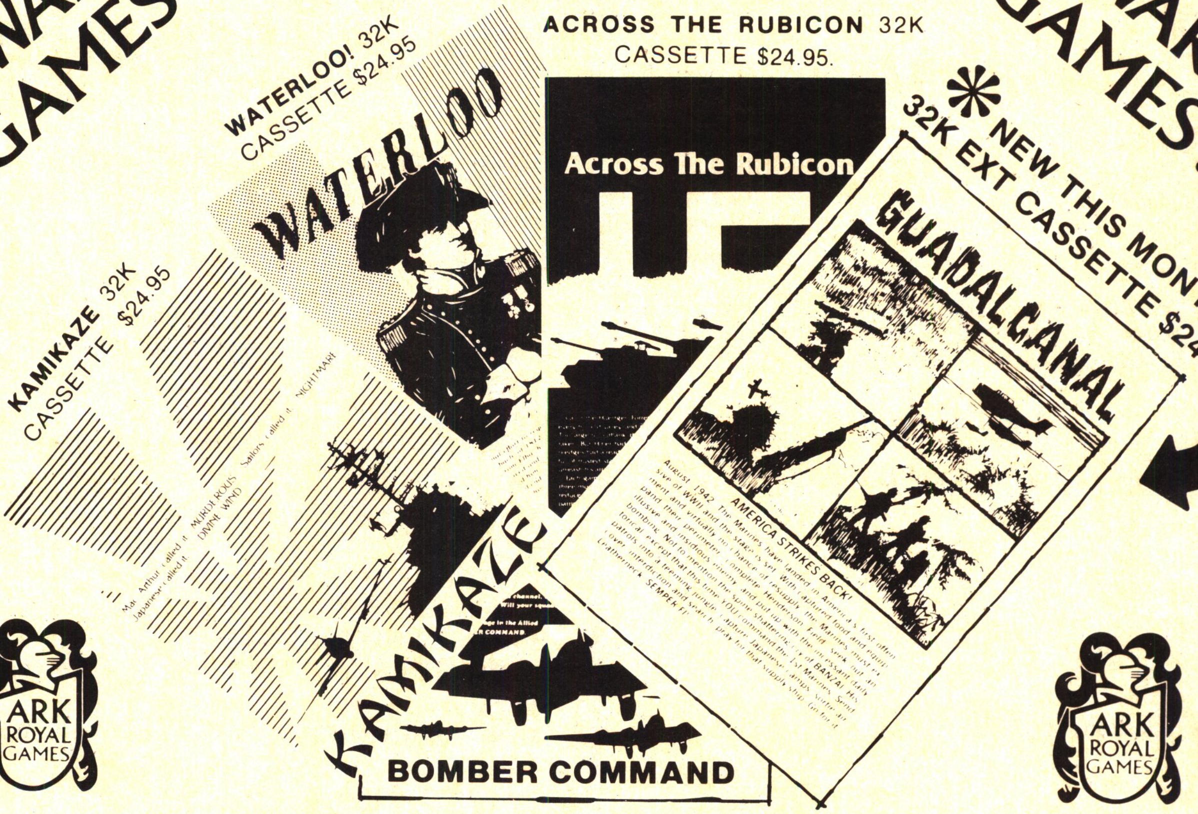

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★The Game Show

Now a lively party game where two teams compete against the clock to name several items in a category. Includes 60 rounds with color graphics and sound. Machine language routine for fast response. (Game Show was reviewed in the Jan. 1983 issue of Rainbow). Requires 16K extended basic and joysticks.

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Genesis Software
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Manchester, Mo. 63011

```
1020 FORT=1TO9:FORY=1TO43:!#AA,L
$(T,Y):!#AA,I$(T,Y):NEXTY,T
1030 CLOSE #AA
1040 IF RF=1 THEN ! NA$+"/DAT":!
 TA$+"/DAT" TO NA$+"/DAT":TA$=NA
$:GOTO 170
1050 GOTO 170
1060 INPUT "TAPE OR DISK (T/D)";
AA$:IF AA$="T" THEN AA=-1 ELSE I
F AA$="D" THEN AA=1 ELSE GOTO 10
60
1070 INPUT "FILENAME";TA$
1080 OPEN "I",#AA,TA$
1090 FORT=1TO9:FORY=1TO43:INPUT#
AA,L$(T,Y):INPUT#AA,I$(T,Y):NEXT
 Y,T:CLOSE#AA
1100 GOSUB 1240:FORT=1TO3:FORY=1
TO13:P=Y*32+T*10+57:PRINT@P,L$(T
+XS,Y+YS);:NEXTY,T:GOTO170
1110 I1$=""
1120 T=T+1:M$=MID$(I$,T,1):IFM$=
">"THEN1140
1130 I1$=I1$+M$:GOTO1120
1140 V(O)=VAL(I1$):O=O+1:GOTO600
1150 IFI$="N"THEN 170
1160 RETURN
1170 L$=MID$(C$,2,1)
1180 IFL$="L" AND XS<>0 THEN XS=
XS-2
1190 IFL$="R"  AND XS<6 THEN XS=
XS+2
1200 IFL$="U" AND YS<>0 THEN YS=
YS-10
1210 IFL$="D" AND YS<30 THEN YS=
YS+10
1220 GOSUB 1240:GOSUB 1290
1230 POKE1101,50+XS:POKE1111,51+
XS:POKE1091,49+XS:FORX=1TO3:FORY
=1TO13:PRINT@Y*32+X*10+57,L$(X+X
S,Y+YS);:NEXTY,X:GOTO170
1240 FOR Y=1TO13:FOR X=1TO3:PRIN
T@Y*32+X*10+57,"       ";:NEXTX
,Y
1250 FOR A =1131 TO 1515 STEP 32
1260 POKEA,96:POKEA+1,96:POKEA+1
0,96:POKEA+11,96:POKEA+20,96
1270 NEXTA
1280 RETURN
1290 FOR Y=1 TO 9 :P=1088+Y*32:T
=YS/10-1+49:POKEP,T:NEXTY
1300 FOR Y=10 TO 13:P=1088+Y*32:
T=YS/10+49:POKEP,T:NEXTY
1310 RETURN
1320 PRINT@0,"START ROW":INPUT A
1330 PRINT@0,"LAST ROW":INPUT B
1340 FOR Y=A TO B:FOR X=1 TO 9
1350 PRINT#-2,TAB((X-1)*9)L$(X,Y
);
1360 NEXTX:PRINT#-2,CHR$(13);:NE
XTY:RETURN
```

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A combined and menu driven version of the above programs. Includes play money. Reviewed - Rainbow 7/83

THE QUIZ MAKER by David Stanley
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A program that enables a teacher to create tests or a student to study for tests in any subject area. Your questions and answers may be saved for future use. Short answer, true-false, fill-in and other quiz formats are supported. Printer option for hard copy test generation. Program randomizes questions, keeps track of score and provides a variety of testing formats.

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A great aid to teachers. Records and calculates grades for up to 6 classes of up to 40 students each. Uses number or letter grades, named or numerical periods and gives a weighted average. Easy to use. Full directions. DISK ONLY. By David Lengyel.

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These Language Arts programs cover common misspellings, and synonyms/-antonyms on each level. Additionally, Level 1 tests contractions and abbreviations, Level 2 tests homonyms, and Level 3 tests analogies. Each program has 3 parts and contains over 400 questions and uses over 800 words. All tests are grade appropriate. User modifiable (directions included). Printer option.

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These tutorials take the child through each step of the example. All programs include HELP tables, cursor and graphic aids. All allow user to create the example, or let the computer choose. Multi-level. Great teaching programs. By Ed Guy.

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FRACTIONS TUTOR (Subtraction)	$19.95
FRACTIONS TUTOR (Multiplication)	$19.95
Any 2 FRACTIONS programs	$29.95

KING AUTHOR'S TALES by Steve Blyn
32K EB. disk or 16K EB. tape $29.95
An exciting new program that allows users to create and save original stories on files. Saves optional questions and answers for each page, and title page picture, too. Kids can write compositions, teachers/parents can create reading comprehension material. Rewrite, correction, review, and printer features. Includes a selection of stories and pictures.

FIRST GAMES by Penny Bryan
32K EB. tape $24.95 disk $27.95
First Games contains 6 menu-driven programs to delight and teach your early learners (ages 3-6). These games enrich the learning of colors, numbers, lowercase letters, shapes, memory, visual discrimination and counting.

MATH INVADERS by David Steele
16K EB. $17.95
A multi-level 'Space Invaders' type game to reinforce the 4 basic math operations (addition, subtraction, multiplication and division). Problems become more difficult as you progress. Hi-res. graphics, joystick required.

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(ALL PROGRAMS IN 16-K EXTENDED EXCEPT WHERE NOTED)

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TRS-80 Color Computer. TD PSystem 100.

PRINT#-2, *(continued from Page 14)*

And, especially in the case of the west coast, what with the difference in time (Louisville/Prospect is on Eastern time), it sometimes makes it hard to contact us and for us to contact people.

We never forget that we started as a "kitchen table" operation. And, as you are well aware, most of the people who sell software and hardware for the CoCo also started that way. We need to work around their "other work" schedules and the like, and having people in different time zones makes that easier to do.

By the way, one of the things we have always tried to do at *the Rainbow* is to encourage new people who are starting out to get involved in the CoCo business. We have special introductory advertising rates for people who are just starting. One of the reasons we do this is because we really believe that there are a lot of good ideas out there that just need a little help to get a start. So, if you are one of these people, please get in touch with us. Your program or product may well be the next best-seller in the industry!

You read in the "Pipeline" recently that *Color Computer News* had ceased publication and that *Hot CoCo* was going to pick up the subscriptions still outstanding by *CCN*.

As it turns out, this is not so, although at the time we printed the information, we had the information "checked out" by both sides. My understanding is that a tentative agreement fell through at the last minute. So, no, *Hot CoCo* will not fulfill subscriptions for *CCN*. And, really, that is all we know at this point. I am sorry for any inconvenience that the earlier report may have caused you, or the people involved.

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You may notice that our subscription label looks just a little bit different this month. It is not what we put on it, but how we put it on it. (Does that make sense? No? Well, now you know why they won't let me write anything but this column every month.)

One of the biggest problems we have had with *the Rainbow* has been the printing of subscription labels and lists each month. And, every time we think we have it licked, the subscription list swells up again and we seem to be right back where we started.

For the purposes of history, the very first subscription labels were done on a Line Printer VII that ran at 50 characters per second. Having previously dealt with a Quick Printer II, on which I did not try to run labels (it used aluminum paper), I really thought we had moved uptown at that stage.

But we experienced some growth, and it took a couple of hours to run out the subscription list before too long. So, I moved to an Epson MX-80, which featured 80 cps and bidirectional printing. Thought I was in hog heaven, too.

Ah, but. Our list kept growing. At one point, it took 12 hours to print out the subscription list from the MX-80. Just too long. So, next, I invested in a 220 cps DMP 500, which is also bidirectional. This is about the fastest general purpose line printer you can buy. But, still, new subscriptions kept coming in. During the printing of December's issue, it actually took almost 24 hours to run out the subscription list. And, there was another 24-hour period involved in the printing of the subscription list that we use here for reference and to answer questions when you call or write.

For a change, I concentrated on the problem and realized that, what with the way we are growing (we added almost 4,000 new subscribers in December, for instance) no general purpose printer would ever solve the problem for us completely. So, with the help of Gordon Monnier at MichTron, I scoured COMDEX in Las Vegas for a printer that might get us out of this jam once and for all.

Enter our Mannesman-Tally 660. This gem (I can't call it a *little* gem because it isn't little) prints 600 lines per minute. Yes, that is lines, not characters. All of a sudden, a job that had taken a whole day to do became one that can be done in less than eight hours. And, because we don't have to tie up the computer for another day, we can get more frequent updates of our subscription lists to help when you call or write us with questions.

This one is fast, and designed to do the kind of job that we need done. Because of the way it works, the dots in its matrix print heads look a little different — so that's why you might see a change in your label.

Finally, I am pleased to be able to say that Bonnie Shepard has been named Director of Fulfillment Services for all of our publications. Bonnie comes to us with an excellent background in customer service and computers — something that is needed to keep the "business" computers working properly.

We're glad to have Bonnie with us and believe she will be able to help you with any problems you might have concerning your subscription or delivery of your *Rainbow*.

— Lonnie Falk

The horses have moved nervously through the paddock and are now entering the track. You only have a few minutes to search your Daily Racing Form *for some clue you might have overlooked — a bloodline, a strong finish that didn't show up in the winnings, a longshot who's done well under similar track conditions — something, anything to give you an edge; but you'd better hurry, the horses have now reached the starting gate and the windows are about to close. There's no more time to deliberate. You swallow hard, force the warring factions of your mind to instant armistice, unfurl the two limp one-dollar bills you were unconsciously strangling in your sweaty grip and, announcing to the teller your final, irrevocable choice, you . . .*

PLACE YOUR BET!

By Kenneth Hall

Paribet duplicates a parimutuel wagering system used at race tracks. It was conceived after a friend asked if a parimutuel wagering system could be written for a "Derby Party" he was planning for the first Saturday in May. (When else?)

The program contains a wagering window which can be opened for 11 races. It can also be closed prior to the start of the race.

At any time, the wager pools can be displayed as well as the odds board. When the window is closed, a call to the post is sounded and you are asked to input the winning horses. The screen then flashes "unofficial" until a "Y" is pressed. Then the race is official and the payoffs are displayed.

As at the track a percent of each wager can be retained to cover party costs or to contribute to charity. Also a minimum payoff per one dollar bet can be set if desired.

At the bottom of the payoff screen A+ or A– is shown indicating how the house made out on its percent take. If you want to change these parameters press F for fix.

In order to set the percent take and minimum payoff, a code word is entered. It is KNH as line 15 dictates but can be changed.

If a printer is used tickets can be printed and a copy of the wager screen, odds screen and payoff screen can be obtained. *Paribet* requires a Line Printer VII or DMP-100 printer to print the tickets.

All options are displayed at the bottom of each screen. Several of the screens flash the first letter of the option as an attention getter. This was achieved simply through *PRINT@* statements inside *INKEY* loops and is impressive to those unfamiliar with the power of the CoCo.

The flashing borders around several of the screens were created by a program which appeared in the April 1983 *Rainbow* which I placed in an *INKEY* loop.

This is not a game and is intended for use with non-illegal activities. There are many groups who use video tapes of races to raise money for worthwhile causes who could benefit from this program.

(Kenneth Hall is a plant controller for Joseph E. Seagram & Sons, Inc. He is also responsible for a Data point Arcnet system and has been programming on the Color Computer for over two years.)

34	15	365	12
134	17	425	89
215	77	475	123
260	127	525	98
320	185	END	122

The listing:

```
5 CLEAR200,32704:GOSUB1010:'SET
UP BORDER
```

HARDWARE & PROGRAMS

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12" Green Screen	$ 89.95
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(by Computerware)

This unit will allow you to bring the composite video signal out of the computer to any monitor, color or monochrome. Sound output is also provided. No soldering or holes to cut. Easy installation instructions are provided.......... $24.95

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*16K/32K

Eight 200 NS Factory Prime Chips with Piggy Backed Sockets, Sam Socket, Bus Wire. Comprehensive Instructions. Recommended for "D" or earlier, but may be used on "E". Only 9 simple solder connections to kit. None to computer. $25.95
NOT FOR CoCo 2

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(by Bill Cook)

For 32K EXT	$24.95
Standard cassette FINAL COUNTDOWN	$14.95

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The program allows the user to build a dictionary of words. During testing, the words are spoken. If an incorrect response is given, the word is spoken again and spelled. Tape (32K EXT) $28.95

TALKING SCORE E-Z

A yahtzee type program. Up to six players can compete. All scoring and record keeping is done by the computer. Tape (32K EXT)........................ $24.95
Standard SCORE E-Z........... $15.95

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The perfect educational game to aid the student in learning addition, subtraction, multiplication and division. Allows one to specify difficulty level.
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```
10 POKE149,0:POKE150,41:DIMHP(11
,16,3),WP(11,3),WN(11),PL(11),SH
(11),B(11,16,3):B$="####.##":C$=
"####":'1200 BAUD POKE
12 'SETS PARAMETER FOR HOUSE PER
CENTAGE,MINIMUM PAYOFF AND WHETH
ER OR NOT TICKETS WILL BE PRINTE
D
15 CLS:INPUT"WHAT IS YOUR CODE";
CW$:IFCW$<>"KNH"THEN18 ELSEINPUT
"  WHAT WILL MINIMUM PAYOFFS PER
 DOLLAR BET BE";PO
16 CLS0:INPUT"WHAT PERCENTAGE OF
 THE WAGER      WILL THE HOUSE RE
TAIN TO COVER COST OR TO GIVE TO
 CHARITY";HK
17 IFHK<1 THENPRINT"ENTER A WHOL
E NUMBER NOT DECIMAL":INPUTHK
18 HK=(100-HK)/100
20 CLS:PRINT"    ARE YOU USING A
 PRINTER FOR TICKETS Y/N"
25 Q$=INKEY$:IFQ$="N" THENP =1EL
SEIFQ$="Y" THENP=0 ELSEIFQ$=""TH
EN25
30 CLS:INPUT"WHAT RACE IS THIS";
R:IFR<1 ORR>11 THEN30
34 'START OF WAGER ROUTINE
35 CLS3:PRINT@75,"DERBY DAY";
40 PRINT@140,"RACE";R;
45 PRINT@165,"PLACE YOUR BETS HE
RE.";
50 PRINT@228," <> ANNOUNCE YOUR
HORSE ";
55 PRINT@260," <> ORDER OF FINIS
H      ";
60 PRINT@292," <> AMOUNT OF YOUR
 WAGER";
62 X=USR0(198)
65 PRINT@450,"pOOL";:PRINT@464,"
cHANGE RACE";
70 PRINT@386,"<><><>YOUR HORSE";
:INPUTH$
75 IFH$="P"THEN135 ELSEIFH$="C"T
HEN30 ELSEH=VAL(H$)
76 IFH>16 THEN70
80 PRINT@386,STRING$(20,32)
85 PRINT@386," ORDER OF FINISH";
:INPUTF
90 IFF<1 ORF>3THEN85
95 PRINT@386,"  AMOUNT OF WAGER"
;:INPUTW
100 PRINT@386,STRING$(23,32);
105 WP(R,F)=WP(R,F)+W
110 HP(R,H,F)=HP(R,H,F)+W
115 IFP=0 THENGOSUB260
120 PRINT@450,"pOOL";:PRINT@458,
"bET";:Q$=INKEY$:IFQ$=""THEN120
125 PRINT@458,"    ";
130 IFQ$="B"THEN70 ELSEIFQ$="P"T
HEN135 ELSEIFQ$="C"THEN30 ELSEGO
TO120
134 'BETTING POOL SCREEN
135 CLS8:PRINT@36,"BETTING POOL"
;:PRINT@55,"RACE"R;
145 PRINT@67,"WIN";:PRINT@75,"PL
ACE";:PRINT@87,"SHOW";
150 PRINT@98,USINGC$;(WP(R,1)*HK
);:PRINT@108,USINGC$;(WP(R,2)*HK
);:PRINT@119,USINGC$;(WP(R,3)*HK
);
155 PRINT@128,STRING$(32,204);
160 PRINT" #   W   P   S   #  W
  P   S"
165 Z=192
170 FORX=1TO16:PRINT@Z,X;:Z=Z+3:
FORY=1TO3:PRINT@Z,USINGC$;HP(R,X
,Y);:Z=Z+4:NEXTY:Z=Z+1:NEXTX
180 IFTR=1THENRETURN
185 X=USR0(169):PRINT@449,"oDDS"
;:FORX=1TO20:NEXTX:PRINT@454,"bE
T";:FORX=1TO20:NEXTX:PRINT@458,"
cLOSE";:FORX=1TO20:NEXTX
190 X=USR0(166):Q$=INKEY$:PRINT@
449,"O";:FORX=1TO25:NEXTX:PRINT@
454,"B";:FORX=1TO25:NEXTX:PRINT@
458,"C";:FORX=1TO25:NEXTX:IFQ$="
"THEN185
195 IFQ$="B"THEN35 ELSEIFQ$="O"T
```

speed reading $17.95

Here's a program to help you increase your reading speed dramatically. Reading material appears on the TV screen at the speed you select, training you to read faster than you normally would. You can even vary the speed while reading. Complete with six different text selections. Plus a drill to improve visual span and perception. Instructions describe speed improvement techniques.

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A naughty, sexy computer game for 2 to 6 couples. RAINBOW: "would definitely liven up most parties."

29 monsters $14.95

A text-adventure game that does not require you to guess words from its hidden collection. To escape the evil wizard's castle, you must pass through 29 rooms, each guarded by a hideous monster who will only let you pass if you can devise the correct password based on the clues it gives you.

All programs on cassette tape for 16K Color Computer. Extended BASIC not required. Send SASE for instructions for any program. Prices include postage (PA resid. add 6%). Send check to P.O. Box 210, Jenkintown, PA 19046.

b & b software

RAINBOW CERTIFICATION SEAL

```
HEN200 ELSEIFQ$="C"THEN310 ELSE1
90
199 'ODDS SCREEN
200 CLS2:PRINT@46,"ODDS";
205 PRINT@64,STRING$(32,191)
207 PRINT@77,"RACE"R;
210 PRINT@96,TAB(2)"HORSE";TAB(9
)"ODDS";TAB(20)"HORSE";TAB(27)"O
DDS";
215 PRINT@128,STRING$(32,252);
220 Z=164
225 FORX=1TO16:PRINT@Z,X;:Z=Z+6:
IFHP(R,X,1)>0 THENPRINT@Z,USING"
###";((WP(R,1)*HK)/HP(R,X,1)); E
LSEPRINT@Z,0;
226 IFHP(R,X,1)=0 THEN230ELSEIF(
(WP(R,1)*HK)/HP(R,X,1))=<1 AND((
WP(R,1)*HK)/HP(R,X,1))>0THENPRIN
T@Z,"EVEV";
230 Z=Z+10:NEXTX
235 PRINT@416,STRING$(64,255);
240 IFTR=1THENRETURN
245 X=USR0(230):PRINT@450,"bET";
:FORX=1TO20:NEXTX:PRINT@454,"pOO
L";:FORX=1TO20:NEXTX:PRINT@459,"
cLOSE";:FORX=1TO20:NEXTX:PRINT@4
65,"oPEN";:FORX=1TO20:NEXTX
250 X=USR0(233):Q$=INKEY$:PRINT@
450,"B";:FORX=1TO25:NEXTX:PRINT@
454,"P";:FORX=1TO25:NEXTX:PRINT@
459,"C";:FORX=1TO25:NEXTX:PRINT@
465,"O";:FORX=1TO25:NEXTX:IFQ$="
"THEN245
255 IFQ$="B"THEN35 ELSEIFQ$="P"T
HEN135 ELSEIFQ$="C"THEN310 ELSEI
FQ$="O"THEN30 ELSE250
259 'PRINT ROUTINE FOR TICKETS D
MP100 USED
260 FORX=1TO15:PRINT#-2,"KY";:NE
XTX:
265 PRINT#-2,"RACE"R
270 PRINT#-2,"* ";CHR$(31)"HORSE
";H;CHR$(30);CHR$(16);"35";"*"
275 PRINT#-2,"*";CHR$(16);"35";"
*"
280 IFF=1THENPRINT#-2,"*       "
;CHR$(31)"WIN";ELSEIFF=2 THENPRI
NT#-2,"*       ";CHR$(31)"PLACE"
; ELSEPRINT#-2,"*       "CHR$(31
)"SHOW";
285 PRINT#-2,CHR$(30);:PRINT#-2,
CHR$(16);"35";"*":PRINT#-2,CHR$(
30);"*";:PRINT#-2,CHR$(16);"35";
"*"
290 PRINT#-2,"*       ";CHR$(31)
;:PRINT#-2,USING"**$###.##";W;:P
RINT#-2,CHR$(30);:PRINT#-2,CHR$(
16);"35";"*"
295 PRINT#-2,CHR$(30);"*";:PRINT
#-2,CHR$(16);"35";"*":FORX=1TO18
:PRINT#-2,"KY";:NEXTX
300 FORX=1TO5:PRINT#-2:NEXTX
305 RETURN
309 'CLOSE WINDOW ROUTINE AND EN
TER WINNERS OF THE RACE
310 PLAY"L4T5O2CFAO3L8CT7P8CP64C
P64CP8O2T5L8AT7P8AP64AP64AP8T5L8
.FO3CO2FL1CL4P2CFAO3L8CT7P8CP64C
P64CP8O2T5L8AT7P8AP64AP64AP8T5L8
.CP64CP64CL1F":CLS0:PRINT@72,"WI
NDOW IS CLOSED";
315 PRINT@108,"RACE "R;
320 PRINT@224,"THE WINNER OF RAC
E";R" IS:";:LINE INPUTWN$:WN(R)=
VAL(WN$)
325 PRINT@288,"THE PLACE HORSE I
S:";:LINEINPUTPL$:PL(R)=VAL(PL$)
330 PRINT@352,"THE SHOW HORSE IS
:";:LINEINPUTSH$:SH(R)=VAL(SH$)
334 'SHOWS RACE AS UNOFFICIAL UN
TIL A 'Y' IS ENTERED
335 PRINT@427,STRING$(10,169);:F
ORX=1TO50:NEXTX:Q$=INKEY$:PRINT@
427,"UNOFFICIAL";:FORX=1TO100:NE
XTX:IFQ$=""THEN335
340 IFQ$="Y"THENPRINT@427," offi
cial "; ELSE320
345 FORX=1TO30:PRINT@427," OFFIC
IAL ";:FORY=1TO75:NEXTY:PRINT@42
7,STRING$(10,255);:FORY=1TO60:NE
XTY:SOUNDX+7*X,1:NEXTX:FORX=1TO2
0:SOUNDRND(255),1:NEXTX
349 'PAYOFF SCREEN BEGINS
350 CLS8:PRINT@5,STRING$(22,214)
;:PRINT@32,STRING$(5,214);:PRINT
@44,"WINNERS";:PRINT@59,STRING$(
5,214);
355 PRINT@69,STRING$(7,214);"RAC
E"R;STRING$(8,214);
360 PRINT@97,"HORSE";:PRINT@106,
"WIN";:PRINT@114,"PLACE";:PRINT@
123,"SHOW";
364 'COMPUTE PAYOFF AND LIST TO
SCREEN
365 PN=HP(R,WN(R),2)+HP(R,PL(R),
2):IFPN=0 THENPN=1
370 SN=HP(R,WN(R),3)+HP(R,PL(R),
3)+HP(R,SH(R),3):IFSN=0THENSN=1
375 A$="##.#"+"0":'ROUNDS PAYOFF
 FOR DISPLAY TO NEAREST $.10
380 PRINT@163,WN(R);:IFHP(R,WN(R
),1)>0THENB(R,WN(R),1)=((WP(R,1)
*HK)/HP(R,WN(R),1)):IFB(R,WN(R),
1)>0 ANDB(R,WN(R),1)<PO THENB(R,
WN(R),1)=PO
385 PRINT@170,USINGA$;B(R,WN(R),
1);
390 IFHP(R,WN(R),2)>0ORHP(R,PL(R
),2)>0 THENA=HP(R,WN(R),2)/PN EL
SEPRINT@178,0;
```

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```
395 IF(HP(R,WN(R),2)/PN)=1 OR(HP
(R,PL(R),2)/PN)=1 THENA=0
400 IFHP(R,WN(R),2)>0 THENB(R,WN
(R),2)=(((1-A)*WP(R,2)*HK)/HP(R,
WN(R),2)):IFB(R,WN(R),2)>0 ANDB(
R,WN(R),2)<PO THENB(R,WN(R),2)=P
O
405 PRINT@178,USINGA$;B(R,WN(R),
2);:AS=1:M=1:IFHP(R,WN(R),3)>0 A
NDHP(R,PL(R),3)>0 ANDHP(R,SH(R),
3)>0THENM=.5ELSEIFHP(R,WN(R),3)>
0 THENAS=HP(R,WN(R),3)/SN
410 GOSUB505
415 IFAS<>0 ANDHP(R,WN(R),3)<>0
 THENAS=HP(R,WN(R),3)/SN
420 IFHP(R,WN(R),3)>0 THENB(R,WN
(R),3)=(((M)*(1-AS)*(WP(R,3)*HK)
)/HP(R,WN(R),3)) :IFB(R,WN(R),3)
>0 ANDB(R,WN(R),3)<PO THENB(R,WN
(R),3)=PO
425 PRINT@186,USINGA$;B(R,WN(R),
3);
430 PRINT@227,PL(R);:IFHP(R,WN(R
),2) ORHP(R,PL(R),2)>0 THENA=HP(
R,PL(R),2)/PN ELSEPRINT@242,0;
435 IF(HP(R,WN(R),2)/PN)=1 OR(HP
(R,PL(R),2)/PN)=1 THENA=0
440 IFHP(R,PL(R),2)>0 THENB(R,PL
(R),2)=(((1-A)*WP(R,2)*HK)/HP(R,
PL(R),2)):IFB(R,PL(R),2)>0 ANDB(
R,PL(R),2)<PO THENB(R,PL(R),2)=P
O
445 PRINT@242,USINGA$;B(R,PL(R),
2);
450 IFAS<>0 ANDHP(R,PL(R),3)<>0
THENAS=HP(R,PL(R),3)/SN
455 IFHP(R,PL(R),3)>0 THENB(R,PL
(R),3)=(((M)*(1-AS)*(WP(R,3)*HK)
)/HP(R,PL(R),3)):IFB(R,PL(R),3)>
0 ANDB(R,PL(R),3)<PO THENB(R,PL(
R),3)=PO
460 PRINT@250,USINGA$;B(R,PL(R),
3);
465 PRINT@291,SH(R);:IFAS<>0THEN
AS=HP(R,SH(R),3)/SN
470 IFHP(R,SH(R),3)>0 THENB(R,SH
(R),3)=(((M)*(1-AS)*(WP(R,3)*HK)
)/HP(R,SH(R),3)):IFB(R,SH(R),3)>
0 ANDB(R,SH(R),3)<PO THENB(R,SH(
R),3)=PO
475 PRINT@314,USINGA$;B(R,SH(R),
3);
480 PRINT@360,"PER DOLLAR PAYOFF
";
485 IFTR=1THENRETURN
486 OC=1:GOSUB605
490 X=USR0(198):OC=0:PRINT@450,"
pOOL";:FORX=1TO25:NEXTX:PRINT@45
5,"oPEN";:FORX=1TO25:NEXTX:PRINT
@460,"cOPY";:FORX=1TO25:NEXTX:PR
```

```
INT@465,"fIX";:FORX=1TO20:NEXTX
492 IFNT>0 THENPRINT@475,"+"; EL
SEPRINT@475,"-";
495 X=USR0(201):Q$=INKEY$:PRINT@
450,"P";:FORX=1TO20:NEXTX:PRINT@
455,"O";:FORX=1TO20:NEXTX:PRINT@
460,"C";:FORX=1TO20:NEXTX:PRINT@
465,"F";:FORX=1TO20:NEXTX:IFQ$="
"THEN490
500 IFQ$="P"THEN135 ELSEIFQ$="O"
THEN30 ELSEIFQ$="C"THEN515 ELSEI
FQ$="F"THEN15 ELSE495
505 IFHP(R,WN(R),3)/SN=1 ORHP(R,
PL(R),3)/SN=1 ORHP(R,SH(R),3)/SN
=1 THENAS=0
510 RETURN
514 'PRINTS A HARD COPY OF WAGER
 POOL,ODDS SCREEN,PAYOFF SCREEN
515 TR=1:GOSUB135:GOSUB520:GOSUB
200:GOSUB520:GOSUB350:GOSUB520:G
OTO600
520 FORX=0TO14:FORY=1TO32:Q=PEEK
(((X*32)+Y)+1023)
525 IFQ=>127THENQ=32:GOTO535
530 IFQ=>96THENQ=Q-64
535 PRINT#-2,CHR$(Q);:NEXTY:PRIN
T#-2,"":NEXTX
540 RETURN
600 TR=0:PRINT#-2,"NET TAKE FOR
RACE"R
604 'COMPUTE HOUSE TAKE OR LOSS
605 NT=(WP(R,1)+WP(R,2)+WP(R,3))
-((B(R,WN(R),1)*HP(R,WN(R),1))+(
B(R,WN(R),2)*HP(R,WN(R),2))+(B(R
,WN(R),3)*HP(R,WN(R),3))+(B(R,PL
(R),2)*HP(R,PL(R),2))+(B(R,PL(R)
,3)*HP(R,PL(R),3))+(B(R,SH(R),3)
*HP(R,SH(R),3)))
606 IFOC=1 THEN RETURN
610 PRINT#-2,USING"###.##";NT:GO
TO350
1009 'SCREEN BORDER ROUTINE *RAY
 GAUVREAU APRIL 1983 RAINBOW*
1010 FORCC=32704TO32732:READC:PO
KECC,C:NEXTCC
1020 DEFUSR0=32704
1030 DATA189,179,237,31,152,142,
4,0,16,142,4,31,237,137,1,224,23
7,164,49,168,32,237,129,140,4,32
,38,240,57
1040 RETURN
1049 END
1050 'VARIABLES**PO-MINIMUM PAYO
FF:HK-HOUSE TAKE %:NT-NET TAKE:W
N-WINNING HORSE:PL-PLACE HORSE:S
H-SHOW HORSE:R-RACE #:H-HORSE #:
F-ORDER OF FINISH:W-WAGER:WP-WAG
ER POOL:HP-HORSE POOL:B-DISPLAYE
D PAYOFF
```

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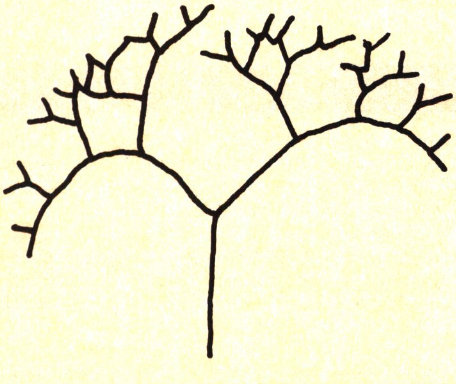
GREETINGS
from
UNCLE
BERT

Greetings!

It's been snowing for umpteen days now. This ought to be the last storm of the season, I keep telling myself. Spring is here, right? Sometimes it stops snowing, and I go outside and shovel a path to the barn. Then the wind starts up and moves the path over several feet so that I get lost. I shovel another path and the wind moves that one over, too. I shovel another path and try to anchor it in place with icicles and iceballs, and then the wind stops blowing and it starts snowing again. Weather can be a problem. It's one of those things humanity has not yet learned to control — like baldness and Bertha. Fortunately, the pigs are warm, all snug in their house. I have an automatic feeder out there, so I don't necessarily have to go visit them every day. Me — I spend a lot of time indoors practicing my meditation, reading the newspaper, and playing with my Color Computer.

One day as I was playing with my Color Computer, I happened to look out my window. What did I see? Nothing! I couldn't see out my window — it was covered with frost. The frost looked like this:



I saw that when nature does graphics, he or she tends to repeat himself or herself. Is nature boring or what? Not much imagination, that nature. Just the same pattern over and over, only sometimes the pattern is changed a little with each repeat. For example, sometimes the pattern is repeated only smaller. Look at how the frost tends to grow one big basic pattern, but each part of the big basic pattern grows its own mini basic patterns of the same type, and so on, over and over. I said to myself, "If I can't get my Color Computer to repeat itself over and over again, my name isn't William Bertrand Woofensburger." Glancing at the frost on my window, I first thought about drawing a "Y." A Y would mean moving forward along a stem, branching to the right and making a small stem, then branching to the left with another small stem, then moving back. Like this:

```
TO Y :N

FD :N
RT 15
FD :N/2 BK :N/2
LT 30
FD :N/2 BK :N/2
RT 15
BK :N
END
```

Already, I was sort of repeating myself — each of the smaller stems was just a repetition (at half size) of the main stem. Now, if I really wanted to repeat the pattern, I figured I could try this:

```
TO Y  :N

FD :N
RT 15
Y (:N/2)
LT 30
Y (:N/2)
RT 15
BK :N
END
```

The plan was to have the computer draw a Y, and stop to draw a half-sized Y at the two ends; and stop to draw a half-sized Y at the ends of those ends; and so on. It didn't work. It never began forking the way a good Y should. Why? Y? I thought, and looked at the screen, and looked then at my procedure. I began to think that maybe the procedure was stuck repeating itself infinitely, forever dividing the first shrinking :N value by 2, and never getting a chance to complete the rest of the procedure. Thus, I decided I would try to stop the infinite shrinking of the value for :N. How? Common sense and a friend told me that I could tell the computer, "If :N becomes less than 2, stop shrinking :N, and get on with the rest of the procedure." In LOGO terms:

```
IF :N<2 (STOP)
```

The conditional *IF* statement was new to me, as was the STOP, but I remembered from high school that "<" meant "less than." I inserted that instruction in my procedure.

```
TO Y  :N

IF :N<2 (STOP)
FD :N
RT 15
Y (:N/2)
LT 30
```

(W. Bert Woofensburger ["Uncle Bert"] manages a hog and corn farm near Ypsilanti, Mich. He has recently acquired a Color Computer and is learning LOGO*. Woofensburger's editor and assistant, Dale Peterson, writes for a living. His recent books include "Genesis II: Creation and Recreation With Computers" and "Intelligent Schoolhouse: Readings On Computers and Learning." He is currently working on a book about Color* LOGO *with Don Inman and Ramon Zamora, to be published in 1984.)*

```
Y (:N/2)
RT 15
BK :N
END
```

Well, that looked a little more like the frost I was trying to make, but I thought the value of :N was shrinking too fast. If :N shrank more slowly, wouldn't it branch better? So I decided to shrink the procedure by 3/4 with each repetition. I also thought I might expand the angle of the branching a little. I came up with the following:

```
TO FROST :N

IF :N<2 (STOP)
FD :N
RT 35
FROST (3*:N/4)
LT 70
FROST (3*:N/4)
RT 35
BK :N
END
```

I should mention that I also tried to make it even more like frost by telling the BG to be 0 and the PC to be 3, but that didn't work. Why? I get the impression that STOP erases color. Anyhow, that was neat. And I experimented with frost for awhile before I got tired of it. I wiped the frost away from my window to see if I could be inspired by anything else. What did I see? A snowstorm. I quickly wrote a good snowstorm procedure.

```
TO SNOW

TURN OFF COMPUTER
WITH TV STILL ON
END
```

That was not entirely satisfactory to me, however. I wanted to get a sky-sized screen, for one thing, for greater realism. Then I thought about my FROST procedure, and it suddenly occurred to me that snow was merely frost without a windowpane. What happens when you don't have a windowpane? The frost tends to grow equally in all directions, producing circles. So, I tried making my frost into a circle.

```
TO FROST2 :N

IF :N<2 (STOP)
FD :N
RT 45
FROST2 (3*:N/4)
LT 90
FROST2 (3*:N/4)
RT 45
BK :N
END

 TO SNOWFLAKE :N

REPEAT 8 (FROST2 :N RT 45)
END
```

I tried that out, and then I decided to get fancy and make the angle into a variable. The result was:

```
TO FROST3 :N :ANGLE

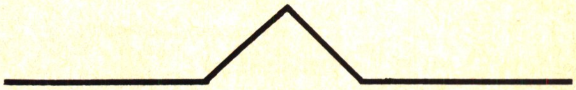
IF :N<2 (STOP)
FD :N
RT :ANGLE
FROST3 (3*:N/4) :ANGLE
LT 2*:ANGLE
FROST3 (3*:N/4) :ANGLE
RT :ANGLE
BK :N
END

TO SNOWFLAKE2 :N :ANGLE

REPEAT 360/:ANGLE
(FROST3 :N :ANGLE RT :ANGLE)
END
```

I tried a number of values for :N and :ANGLE. Generally I kept :N to about 25. For :ANGLE, I tried such things as 45, 90, 30 and so on. I got some right nice snowflakes out of that.

I worked on some other ways to make snowflakes, sometimes with the help of my Color Computer manual. For example, I learned about the bump on a log procedure. The idea is to have the turtle draw a straight line with a bump on it, like so:



Now this "straight line with a bump on it" is really four lines. So it would be easy to make a self-referring procedure that would turn those four lines into bumpy lines themselves, and so on forever. Needless to say, we should also give the computer a limit, so it doesn't try to go on forever with one part of the procedure before it gets to the other parts.

```
TO BUMPONBUMP :N

IF :N<10 (FD :N STOP)
BUMPONBUMP (:N/3)
LT 60
BUMPONBUMP (:N/3)
RT 120
BUMPONBUMP (:N/3)
LT 60
BUMPONBUMP (:N/3)
END
```

That gives you a nice and very bumpy line. To turn that into a snowflake, you just make the "line" into sides of a manysideagon.

```
TO SFLAKE :N

REPEAT 6 (BUMPONBUMP :N RT 60)
END
```

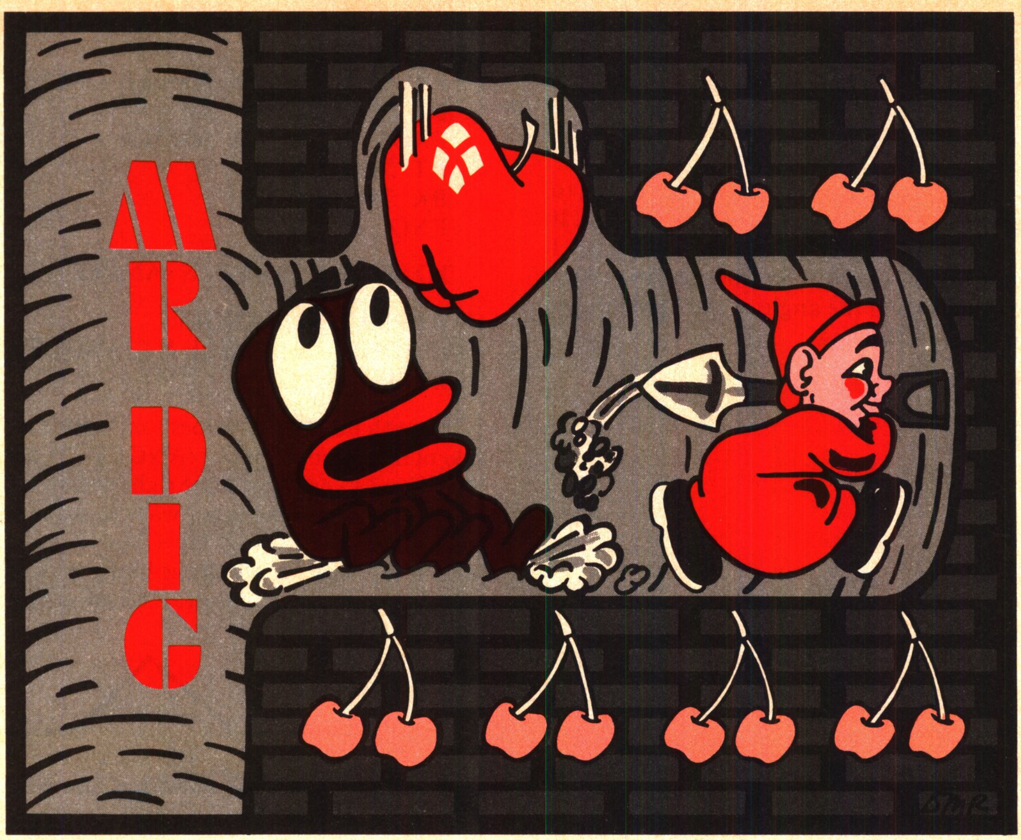
To take it further, try this (with values for :N around 25 to 45):

```
TO MORE :N

BG 0 PC 3
REPEAT 6 (SFLAKE :N RT 60)
END
```

Other snowflake procedures also make use of this self-referring principle. For instance, you could tell the turtle to draw a certain line and angle, and then have the turtle enlarge that line by a little bit, over and over again. Like so:

```
TO FLAKE :LINE :ANG :EXTRA
```



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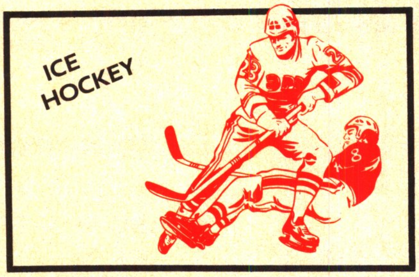

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```
FD :LINE
RT :ANG
FLAKE (:LINE + :EXTRA)
:ANG :EXTRA
END
```

Oops! I forgot to tell it to stop. Try again.

```
TO FLAKE :LINE :ANG :EXTRA

IF :LINE>45 (STOP)
FD :LINE
RT :ANG
FLAKE (:LINE + :EXTRA)
:ANG :EXTRA
END
```

Then I tried various values for :LINE and :ANG and :EXTRA, such as 1 144 1; and 1 120 3; and so on. You do, too.

This snowflake nonsense could go on forever, and I was expecting it to when all of a sudden outside of my window I heard the creak-creak-creak crunch-crunch-crunch sounds of someone walking in the snow. In the middle of a blizzard! Who? Who would be foolish enough? As you already know, our little farm is so far away from anything even the mailperson never comes near; she sends her trusty mailpooch. I heard a rapping sound at the door. Rap! Rap! Rap! I opened the door, snow poured in, and along with it entered a long, tall wraith, covered with snow and ice from head to foot. This creature took off a hat — snow plopped to the floor, and a mass of dark hair appeared. The creature began unbuttoning an overcoat, a sheet of ice covering the coat cracked, and crashed to the floor. Then the creature — no, it was human! — began brushing ice and snow away from his face, icicles fell away from a broad walrus mustache and tinkled down, revealing the gaunt, yet handsome visage of my good old friend Don Inman!

"Welcome!" I said, and Don explained that he had come all the way from California to experience real weather.

"How do you like it?" I asked, but by then his lips had frozen shut. I took him into the kitchen and gave him something warm to drink. A few minutes later, we went down to my den, and I showed Don my snowflakes. He said he was very impressed, and he called them "recursions." Apparently, when a procedure refers to itself (like a snake eating its tail), it's called a "recursion." Next Don showed me a few computer games he had been thinking about. [Footnote: The following games are based upon material developed by Don Inman for his "Color LOGO Teachers' Manual #2."]

Don told me he had been reading my letters in *Rainbow*, and had decided that I needed to give my readers a chance to practice guessing X and Y coordinates. He also scolded me for not demonstrating the *PRINT* statement. I said I didn't know much about *PRINT*, so he explained that *PRINT* will both print text onto the screen, and display "hidden" material (a variable, a number, a function, or a combination thereof). Then he typed in the following on the keyboard of my Color Computer:

```
TO GAME1

CLEAR
MAKE :COL RANDOM 245+5
MAKE :ROW RANDOM 150+30
HT SX :COL SY :ROW
PRINT "O"
END
```

Don explained that when *PRINT* was followed by something inside of quote marks, the computer would display on the screen whatever that something is. Thus, because we are randomizing X and Y values, the result of the GAME1 procedure was to place or "print" the letter "O" randomly on the screen. Next, Don typed in the following:

```
TO GUESS :X :Y

CLEAR
HT PU SH 90
SX 4 SY 18
PRINT "GUESS"
SX 60 SY 18
PRINT :X FD 32 PRINT :Y
COMPARE
END
```

Don pointed out that the second way of using the *PRINT* statement — when *PRINT* is followed by something (such as a variable) without quote marks — instructed the computer to show the actual value for that something. Here, for instance, Don has just told the computer to display the word "guess," and the values for X and Y. I asked Don why he had instructed the turtle to move FORWARD 32 units after printing the value for X, and he explained that printing a value does not move the turtle; if we don't move the turtle ourselves, it will write the value for Y over the value for X. Altogether, this procedure does nothing but make the computer display precisely what we've typed in, in the first place. For instance, if I type in GUESS 45 90, the computer will *CLEAR* that away and then display (in the same position) GUESS 45 90. Doesn't that seem a waste? I asked Don, and he just mumbled and muttered beneath his drooping mustache, then typed in the following procedure:

```
TO COMPARE

SX 4 SY 8
PRINT "TURTLE"
SX 60 SY 8
PRINT :COL FD 32 PRINT :ROW
SX : COL SY :ROW PRINT "O"
END
```

At last the game began to make sense. The COMPARE procedure, which is merely a subprocedure in the GUESS :X :Y procedure, instructs the computer to print the word "turtle" followed by the X and Y values of the original randomized position of the O, and then to place an O right back up where it was originally. Yep! It was a guessing game, all right, and it allowed us to guess the actual location of a randomly placed dot. We played that for a while, but I kept losing, so I soon became bored. Don tried to revive my interest with another version of the game. He typed in the following procedures:

```
TO GAME2

CLEAR
MAKE :COL RANDOM 245+5
MAKE :ROW RANDOM 150+30
HT SX :COL SY :ROW
PRINT "J"
SX 128 SY 96 ST
END
```

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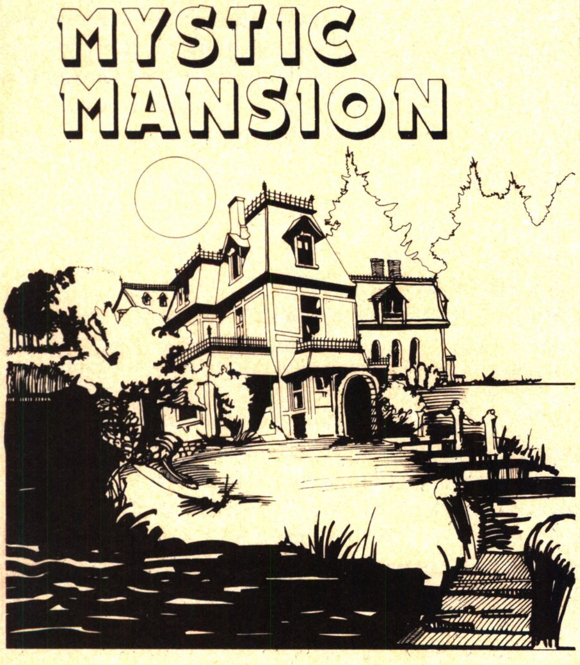

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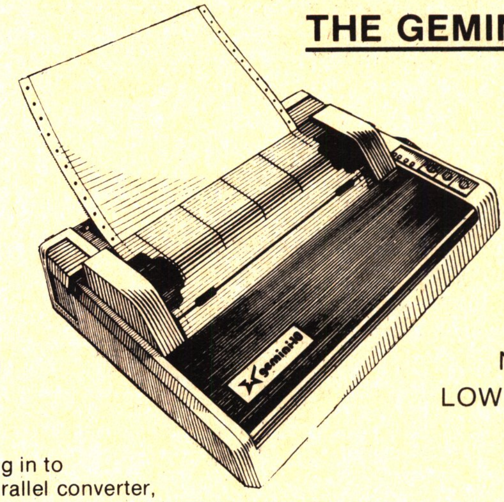

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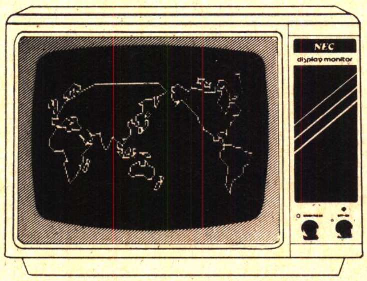

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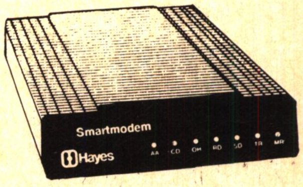

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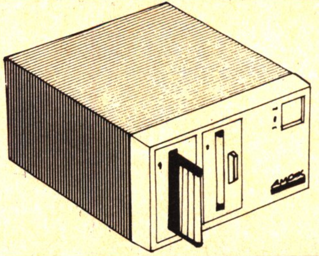

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```
TO J :X :Y

SX :X SY :Y
END
```

That game placed the letter J randomly on the screen. Then we fired the turtle with the J :X :Y procedure. (Typing J, followed by our guesses for X and Y values for the randomly placed J, moved the turtle to our guessed spot.) We took turns and competed to see who could hit the J on the nose first. I liked that game better. Still, after a while I was ready to move on. Without saying a word, laconic Don typed in another game for playing with the SETHEADING function:

```
TO TARGET

COLORSET 1
MAKE :COL RANDOM 175+20
MAKE :ROW RANDOM 110+20
HT SX :COL SY :ROW
PC 2 REPEAT 20 (FD 5 RT 18)
SX :COL-10
PC 1 REPEAT 20 (FD 9 RT 18)
SX :COL-20
PC 0 REPEAT 20 (FD 12 RT 18)
HOME ST
END

TO HIT :HEAD :DIST

PC 2 SH :HEAD FD :DIST
END
```

I thought that was neat, and we played that one for about a half hour, but I (being me) wanted a fancier target. So I pushed Don out of the way, and began experimenting on my own. Like so:

```
TO CIRCLE :RADIUS

REPEAT 360 (PU FD :RADIUS
DOT
BK :RADIUS RT 1)
END

TO DOT

PD RT 90
FD 1 BK 1
LT 90 PU
END

TO FILLCIRCLE :RADIUS

REPEAT :RADIUS/2
(CIRCLE :RADIUS
MAKE :RADIUS :RADIUS-1)
END

TO BULLSEYE

HT PC2
MAKE :X RANDOM 210+20
MAKE :Y RANDOM 150+20
SX :X SY :Y
FILLCIRCLE 8
PC 1 CIRCLE2 16 CIRCLE2 24
CIRCLE2 32
PC 0 CIRCLE2 40
END
```

Naturally, Don began complaining about my game. "The circle takes too darn long!" he grumbled. I thought about that (yes, I can take criticism just as well as the next guy!), and came up with a faster circle, which I then inserted into the rest of the game procedures.

```
TO CIRCLE2 :RAD

REPEAT 180
(PU FD :RAD
DOT
BK :RAD RT 2)
END
```

Eventually, I decided the game needed more realism. Thus, I turned it into a spider and fly game, like so:

```
TO SPIDER

MAKE :X RANDOM 230+10
MAKE :Y RANDOM 160+12
SX :X SY :Y
HT
MAKE :RAD 3
REPEAT 6
(CIRCLE2 :RAD
MAKE :RAD :RAD+5)
PD REPEAT 12 (FD 28
BK 28 RT 30)
SX 128 SY 96 ST
END

TO FLY :X :Y

SX :X SY :Y
END
```

Or,

```
TO FLY :HEAD :DIST

SH :HEAD FD :DIST
END
```

Why a fly should deliberately and with malice aforethought seek out a spiderweb is something neither Don nor I could figure out right away. When we do figure it out, you'll be the first to know. Anyhow, Don and I played these games until about midnight. Then we talked about the weather, and I explained to him how when you're surrounded by ice and snow for a long time you get tired of it, and begin to wish for summer to come.

Well, that was about the extent of our visit. Don is a very quiet person, but he became even quiter than usual as he dozed off, with Ben sleeping across his feet. Next day, the weather paused for a minute, and Don set his heading for California. I have more to say, but it'll have to wait till next month. I remain,

— Uncle Bert

P.S. You can send your cards and letters to me in care of my good friend Dale Peterson. Just address them like this:

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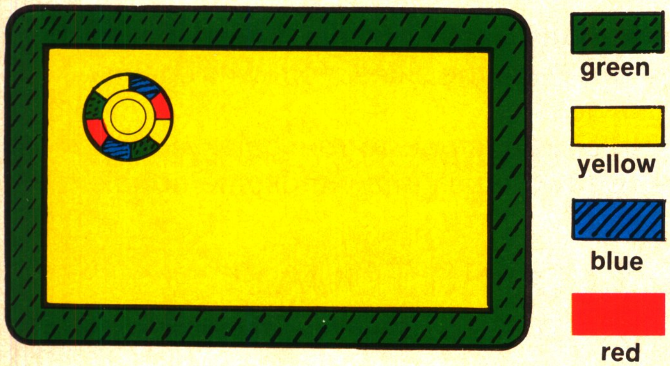
The Beginning Game

By Don Inman
Rainbow Contributing Editor

The pie graph has been the subject of "Using Graphics" in the past two *Rainbow* issues. The pie graph is based on the division of a circle into sections to emphasize size relationships. Many popular gambling games are also based on the circle and its division into sectors. Rather than discuss one of the many popular circle-based gambling games, I'll demonstrate the beginnings of an original game this month. You can change and expand it until you find a version that you think is entertaining, profitable, or both.

The Game will be played in *PMODE 3* to provide a colorful yellow background with a green border. The game wheel consists of three concentric circles. The area between the two outer circles is divided into eight sections which are painted either green, yellow, blue, or red. The movable game "ball" is placed in the area between the two inner circles.



(Don Inman is the acknowledged master of microcomputer graphics and the author of a large number of books, including TRS-80 Color Computer Graphics and Assembly Language Graphics for the TRS-80 Color Computer with Kurt Inman.)

The playing field is placed at the upper-left corner leaving three-quarters of the screen for instructions, winning/losing information, and for whatever else you may want to add to the display.

When *The Game* is played, the ball will travel in a counter-clockwise, circular path. Its motion starts at high speed, but gradually slows until it finally comes to a stop adjacent to one of the eight colored sections. The program consists of the following modules.

1) Set the screen and dimension arrays
2) Load position array for ball and *DRAW* movements for text
3) Draw the game wheel
4) Section and paint the game wheel
5) Initialize the spin and subroutine control
6) Display instructions subroutine
7) Spin the wheel subroutine
8) Display results subroutine

Set the Screen and Dimension Arrays

This section of the program selects *PMODE3* (the highest resolution with four colors). It clears the screen with a yellow background and green border *(PCLS 2)* and turns on the graphics screen using color set 0 *(SCREEN 1,0)*. Space is reserved for many text strings *(CLEAR 300)*, and arrays are dimensioned for text character strings (L$(20)) and *PUT/GET* areas.

```
100 REM ** SET SCREEN AND DIMENS
ION **
110 PMODE 3
120 PCLS 2
130 SCREEN 1,0
140 CLEAR 300
150 DIM L$(20),E(24)
160 '
```

Load Positon Array for Ball and *DRAW* Movements for Text

The simplest way to position the ball is to provide one X,Y position adjacent to each of the eight colored sections of the game wheel. The X and Y coordinates for each of the eight positions are read into separate arrays (X(N) and Y(N)) by a *FOR/NEXT* loop (lines 210-230). The coordinates are read in from the *DATA* statements in lines 240 and 250. *DRAW* movements that form text characters on the graphics screen are assigned in lines 260 through 430.

```
200 REM ** LOAD ARRAY **
210 FOR N=1 TO 8
220 READ X(N),Y(N)
230 NEXT N
240 DATA 76,24,54,24,40,36,40,60
250 DATA 54,72,76,72,88,60,88,36
260 L$(1)="U8R8D4L8BD4BR12" 'P
270 L$(2)="U8R8D4L8BR4F4BR4" 'R
280 L$(3)="U8R8BD4L8BD4R8BR4" 'E
290 L$(4)="BU4U4R8BD4L8BR8D4L8BR
12" 'S
300 L$(5)="U8R8D4L8BR8D4BR4" 'A
310 L$(6)="U8F8U8BD8BR4" 'N
320 L$(7)="BU8F4E4BG4D4BR8" 'Y
330 L$(8)="U8BR8G4L4BR4F4BR4" 'K
340 L$(9)="BU8R8BL4D8BR8" 'T
350 L$(10)="U8R8D8L8BR12" 'O
360 L$(11)="BU8R8BL4D8BL4R8BR4"
'I
370 L$(12)="U8BR8D8H4G4BR12" 'W
380 L$(13)="U8BR8D8BU4L8BD4BR12"
 'H
390 L$(14)="U8BD8R8BR4" 'L
400 L$(15)="U8R8BD4L4BR4D4L8BR12
" 'G
410 L$(16)="U8R6F2D2L8BR8D2G2L6B
R12" 'B
420 L$(17)="U8BR8D8L8BR12" 'U
430 L$(18)="U8R6F2D4G2L6BR12" 'D
440 '
```

Draw the Game Wheel

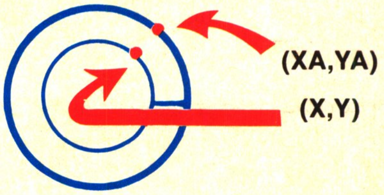
The three circles that form the game wheel are drawn with radii of 24, 32, and 40 units by lines 510 through 530. The centers of all circles are located in the upper-left quarter of the screen at position 64, 48.

```
500 REM ** DRAW CIRCLES **
510 CIRCLE(64,48),24
520 CIRCLE(64,48),32
530 CIRCLE(64,48),40
540 '
```

Section and Paint the Game Wheel

This section uses the same techniques of my two previous articles on pie graphs to divide the area enclosed by the two outer circles into eight parts. Since a complete circle is measured by two radians (equal to 360 degrees), each division consists of two divided by eight or approximately 0.7854 radians. The X,Y positions for the eight divisions are calculated using the sine and cosine functions and the position of the circles' centers.

```
600 REM ** DRAW SECTORS **
610 LINE(96,48)-(104,48),PSET
620 FOR Z=1 TO 8
630 A=Z*.7854: B=Z*.75
640 X=64+32*COS(A)
650 Y=48+32*SIN(A)
660 XA=64+40*COS(A)
670 YA=48+40*SIN(A)
680 LINE(X,Y)-(XA,YA),PSET
690 PAINT(64+36*COS(B),48+36*SIN
(B)),Z,4
700 NEXT Z
710 '
```



X = 64+32*SIN(A)   XA = 64+40*SIN(A)

Y = 48+32*COS(A)   YA = 48+40*COS(A)

Line 680 draws a line between the two calculated points, and line 690 paints the area the appropriate color using the Z variable of the *FOR/NEXT* loop.

Z	Color
1	green
2	yellow
3	blue
4	red
5	green
6	yellow
7	blue
8	red

Initialize the Spin and Subroutine Control

The ball, which will later be put into motion, is drawn by line 810. It looks like a + sign on the screen due to its small radius. Line 820 then calls a subroutine (at line 1010) that displays the starting instruction at the bottom of the screen. Line 830 waits for a key press. When a key has been pressed, old results are erased by lines 840 through 860. A subroutine (at line 2010) is called to spin the wheel by line 870. When the wheel comes to a stop, line 870 calls another subroutine (at line 3010) to display the results of the spin. Line 880 waits for a key press before starting another spin.

```
800 REM ** INITIALIZE SPIN **
810 CIRCLE(76,24),3,4
820 GOSUB 1010
830 I$=INKEY$: IF I$="" THEN 830
 ELSE N=1
840 GET(140,64)-(250,72),E,G
850 PUT(140,8)-(250,16),E,PSET
860 PUT(140,24)-(250,32),E,PSET
870 GOSUB 2010: GOSUB 3010
880 I$=INKEY$: IF I$="" THEN 880
 ELSE 850
890 END
900 '
910 '
```

Display Instructions Subroutine

This section draws the message "PRESS ANY KEY TO SPIN WHEEL" at the bottom of the screen so that the player knows how to start the game. The message stays on the screen. If you wish, you can add some lines to erase the message when the wheel spin is started.

```
1000 REM ** INSTRUCTIONS **
1010 DRAW "BM4,166"+L$(1)+L$(2)+
L$(3)+L$(4)+L$(4)+"BR12"
1020 DRAW L$(5)+L$(6)+L$(7)+"BR1
2"
1030 DRAW L$(8)+L$(3)+L$(7)+"BR1
2"
1040 DRAW "BM4,180"+L$(9)+L$(10)
+"BR12"
1050 DRAW L$(4)+L$(1)+L$(11)+L$(
6)+"BR12"
1060 DRAW L$(12)+L$(13)+L$(3)+L$
(3)+L$(14)
1070 RETURN
1080 '
```

Spin the Wheel Subroutine

The Color Computer's timer is used to control the speed of the ball's movement around the wheel. As the time gets larger, the time delay (line 2070) between movements of the ball gets larger. A random time limit is chosen at line 2010 and is checked at line 2080. This makes the length of each spin a random quantity. When the limit is exceeded, the motion of the ball stops. At this time, the *RETURN* statement returns control to the main program at line 870.

The ball moves in a counter-clockwise direction around its circular path slowing down as it goes. It comes to a stop adjacent to one of the colored areas. That color is the winner. Notice that the last position of the ball (line 2060) is at X(N+1),Y(N+1). The value, N+1, is used to select the correct subroutine to display the winning color in the next section.

```
2000 REM ** SPIN**
2010 F=RND(600)+400
2020 TIMER=0
2030 CIRCLE(X(N),Y(N)),3,2
2040 FOR W=1 TO 50: NEXT W
2050 IF N=8 THEN N=0
2060 CIRCLE(X(N+1),Y(N+1)),3,4
2070 FOR W=1 TO TIMER/3: NEXT W
2080 IF TIMER>F THEN RETURN ELSE
 N=N+1
2090 GOTO 2030
2100 '
```

Display Results Subroutine

The text display of the winning color is selected by the *ON N+1 GOSUB* statement at line 3010. When the appropriate message has been displayed, a *RETURN* to the main program is made at line 3020. The subroutine at lines 3100 through 3120 draw the word "BLUE." Lines 3200 through 3220 draw the word "YELLOW." Lines 3300 through 3320 draw the word "GREEN," and lines 3400 through 3420 draw the word "RED." Each one of these subroutines calls another subroutine (at line 3500) which adds the word "WINS." These are the messages that are erased at lines 840 through 860 when a new spin starts.

```
3000 REM ** DISPLAY RESULTS **
3010 ON N+1 GOSUB 3100,3200,3300
,3400,3100,3200,3300,3400
3020 RETURN
3030 '
3100 DRAW"BM140,16"+L$(16)+L$(14
)+L$(17)+L$(3)
3110 GOSUB 3500
3120 RETURN
3130 '
3200 DRAW"BM140,16"+L$(7)+L$(3)+
L$(14)+L$(14)+L$(10)+L$(12)
3210 GOSUB 3500
3220 RETURN
3230 '
3300 DRAW"BM140,16"+L$(15)+L$(2)
+L$(3)+L$(3)+L$(6)
3310 GOSUB 3500
3320 RETURN
3330 '
3400 DRAW"BM140,16"+L$(2)+L$(3)+
L$(18)
3410 GOSUB 3500
3420 RETURN
3430 '
3500 DRAW"BM140,32"+L$(12)+L$(11
)+L$(6)+L$(4)
3510 RETURN
```

General Comments

In the present form of *The Beginning Game*, the odds are even that the ball will come to rest adjacent to any of the four colors. This could be easily changed by changing the size of one or more colored areas. You could also change the odds by changing colors of some of the areas so that there were more areas of some colors than others. The purpose of the program is to give you a starting point for developing a gambling game of your own. The complete program follows.

400 102
800 159
2000 211
END 217

The listing:

```
100 REM ** SET SCREEN AND DIMENS
ION **
110 PMODE 3
120 PCLS 2
130 SCREEN 1,0
140 CLEAR 300
150 DIM L$(20),E(24)
160 '
200 REM ** LOAD ARRAY **
210 FOR N=1 TO 8
220 READ X(N),Y(N)
230 NEXT N
240 DATA 76,24,54,24,40,36,40,60
250 DATA 54,72,76,72,88,60,88,36
260 L$(1)="U8R8D4L8BD4BR12" 'P
270 L$(2)="U8R8D4L8BR4F4BR4" 'R
280 L$(3)="U8R8BD4L8BD4R8BR4" 'E
290 L$(4)="BU4U4R8BD4L8BR8D4L8BR
12" 'S
300 L$(5)="U8R8D4L8BR8D4BR4" 'A
310 L$(6)="U8F8U8BD8BR4" 'N
320 L$(7)="BU8F4E4BG4D4BR8" 'Y
330 L$(8)="U8BR8G4L4BR4F4BR4" 'K
340 L$(9)="BU8R8BL4D8BR8" 'T
350 L$(10)="U8R8D8L8BR12" 'O
360 L$(11)="BU8R8BL4D8BL4R8BR4"
'I
370 L$(12)="U8BR8D8H4G4BR12" 'W
380 L$(13)="U8BR8D8BU4L8BD4BR12"
 'H
390 L$(14)="U8BD8R8BR4" 'L
400 L$(15)="U8R8BD4L4BR4D4L8BR12
" 'G
410 L$(16)="U8R6F2D2L8BR8D2G2L6B
R12" 'B
420 L$(17)="U8BR8D8L8BR12" 'U
430 L$(18)="U8R6F2D4G2L6BR12" 'D
440 '
500 REM ** DRAW CIRCLES **
510 CIRCLE(64,48),24
520 CIRCLE(64,48),32
530 CIRCLE(64,48),40
540 '
600 REM ** DRAW SECTORS **
610 LINE(96,48)-(104,48),PSET
620 FOR Z=1 TO 8
630 A=Z*.7854: B=Z*.75
640 X=64+32*COS(A)
650 Y=48+32*SIN(A)
660 XA=64+40*COS(A)
670 YA=48+40*SIN(A)
680 LINE(X,Y)-(XA,YA),PSET
690 PAINT(64+36*COS(B),48+36*SIN
(B)),Z,4
700 NEXT Z
710 '
800 REM ** INITIALIZE SPIN **
810 CIRCLE(76,24),3,4
820 GOSUB 1010
830 I$=INKEY$: IF I$="" THEN 830
 ELSE N=1
840 GET(140,64)-(250,72),E,G
850 PUT(140,8)-(250,16),E,PSET
860 PUT(140,24)-(250,32),E,PSET
870 GOSUB 2010: GOSUB 3010
880 I$=INKEY$: IF I$="" THEN 880
 ELSE 850
890 END
900 '
910 '
1000 REM ** INSTRUCTIONS **
1010 DRAW "BM4,166"+L$(1)+L$(2)+
L$(3)+L$(4)+L$(4)+"BR12"
1020 DRAW L$(5)+L$(6)+L$(7)+"BR1
2"
```

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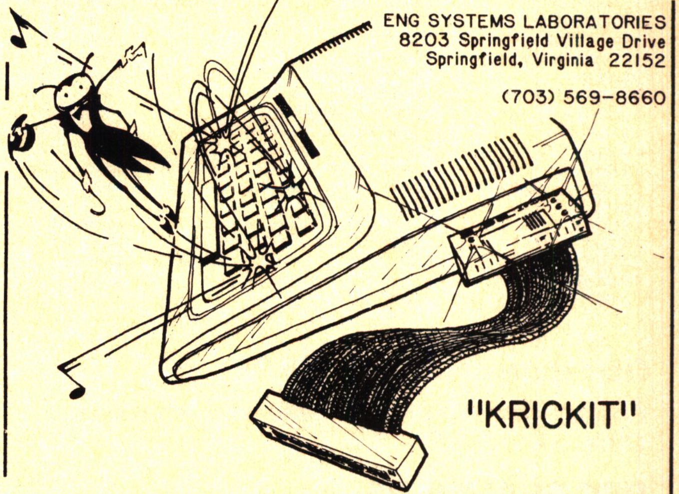

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2"
1040 DRAW "BM4,180"+L$(9)+L$(10)
+"BR12"
1050 DRAW L$(4)+L$(1)+L$(11)+L$(
6)+"BR12"
1060 DRAW L$(12)+L$(13)+L$(3)+L$
(3)+L$(14)
1070 RETURN
1080 '
2000 REM ** SPIN**
2010 F=RND(600)+400
2020 TIMER=0
2030 CIRCLE(X(N),Y(N)),3,2
2040 FOR W=1 TO 50: NEXT W
2050 IF N=8 THEN N=0
2060 CIRCLE(X(N+1),Y(N+1)),3,4
2070 FOR W=1 TO TIMER/3: NEXT W
2080 IF TIMER>F THEN RETURN ELSE
 N=N+1
2090 GOTO 2030
2100 '
3000 REM ** DISPLAY RESULTS **
3010 ON N+1 GOSUB 3100,3200,3300
,3400,3100,3200,3300,3400
3020 RETURN
3030 '
3100 DRAW"BM140,16"+L$(16)+L$(14
)+L$(17)+L$(3)
3110 GOSUB 3500
3120 RETURN
3130 '
3200 DRAW"BM140,16"+L$(7)+L$(3)+
L$(14)+L$(14)+L$(10)+L$(12)
3210 GOSUB 3500
3220 RETURN
3230 '
3300 DRAW"BM140,16"+L$(15)+L$(2)
+L$(3)+L$(3)+L$(6)
3310 GOSUB 3500
3320 RETURN
3330 '
3400 DRAW"BM140,16"+L$(2)+L$(3)+
L$(18)
3410 GOSUB 3500
3420 RETURN
3430 '
3500 DRAW"BM140,32"+L$(12)+L$(11
)+L$(6)+L$(4)
3510 RETURN
```

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Women And The Color Computer

By Susan P. Davis

In this series of articles, we will examine women and their status in the Color Computer world. This month, we will discuss why so many potential CoCo users and programmers are left out. In the next few articles, we'll sympathize with the CoCo widow and offer some useful tips for her, see how mothers and teachers are evaluating and using educational programs, and profile women who are using the Color Computer in their own businesses.

The world of the home computer in general, and the Color Computer specifically, seems to be a male-dominated, male-oriented world. The publishers of the CoCo magazines are men; the authors of the books on how to use your Color Computer are men, the people who submit articles on graphics, BASIC, assembly language and helpful hints are mostly men; *Rainbow's* contributing editors are all men; and the technicians who tell us how to open up our Color Computers and make hardware modifications are men. Admittedly, there are some women submitting articles and writing programs, but not many. Most of the CoCo experts are men. They are the computer pioneers and they are reaping the benefit of this marvelous new world.

Why is the CoCo world so male-dominated? What has made so many women feel unwilling, unable or too apathetic to participate?

The same cultural forces that make auto mechanics, electronics, and higher mathematics "for men," and sewing, cooking and shopping "for women" seem to be at play. Due to this arbitrary environmental conditioning, men of all generations are using their CoCos. The women do not feel as welcome to experiment. Yet some women are fighting to overcome the cultural and psychological blocks and getting to know their Color Computers.

(Gary and Susan Davis are co-owners of Sugar Software in Reynoldsburg, Ohio. Susan is a novice and Gary has been professionally programming for nearly 20 years.)

Relatively few women make unassisted computer purchases. The purchase of a computer and its peripherals is considered to be a technically-oriented decision. Therefore, the women still defer to the men in their lives.

> ". . . if we want more women to use the Color Computer, we have to examine those things of particular interest to women and computerize them."

Women seem to have more of a participatory than an independent role in the purchase of a computer. Sally Baxter of the Home Computer Store in Westerville, Ohio, said that only one woman has independently purchased a Color Computer in her store. The woman wanted a small computer to take away to college. Otherwise, the CoCo purchases were made by men alone, couples or families. The manager of one Columbus, Ohio, Radio Shack Store, a woman, agreed that the purchase of a Color Computer seems to be a family decision: The husband convinces the wife regarding the purchase and she okays the finances. It was her opinion that more Radio Shack home computers are purchased for families with boys than for families with only girls. She noted that women customers still like to talk to male salespeople regarding the computer. Her husband, assistant manager of a Radio Shack Computer Center, felt that school-age children were permitted to choose which computer to buy once the decision to purchase a computer had been made. He noted that women's secondary role in the Color Computer market could be generational, as enrollment in the "computer camps" seems to be 50/50 boys and girls.

Doug Smeltz, who uses a network of 15 CoCos to teach computer programming at Northland High School, says his class composition is half male, half female. He does not find the girls reluctant to get hands-on experience on the CoCo, but has not seen a similar eagerness in women (teachers) one or two generations older.

The manager of another Radio Shack Computer Center told me that less than 50 percent of the Color Computers purchased in his store are purchased by women. When the women do buy, they have a clearly defined idea of what they want. They often purchase software at the time they get the computer. These women use the computer as a tool to perform a specific task (e.g., word processing). Male customers, he felt, are more interested in the "bells and whistles." First, they buy the Color Computer; then they find things to do with it.

Once the Color Computer is in the home, school or office, do the women use it? Do they buy the software for it? Larry Reitz of Reitz Electronics feels that more women are taking a serious look at what is available and that some are buying. Word processing programs and educational programs for the children seem to be the principal software packages purchased by women at Larry's store. Tommy Fetterman of Delker Electronics said the same is happening there. He has several teachers who have CoCos at home and in school coming in to purchase educational software. Tommy said "two or three" women are into word processing and purchase those programs from him. The female assistant-manager of one program store has found that women are buying more programs as gifts for their husbands and children. If they are buying programs for their own use, they tend to be word processing programs and not business-oriented (databases, mailing list managers, spread sheets, etc.) or arcade type games. She noted that female customers asked her for help or advice; the male customers wait for a male salesperson. At Sugar Software, we find that our customers are about 80 percent male, 20 percent female overall, with very few women purchasing our utilities like *Auto Run, Piratector* and *Semigraf.*

"... we hope that more women will take an interest in the CoCo."

Perhaps there need to be more programs on the market that are of interest to women. Moreton Bay's *File Cabinet* (database) has a recipe file as a sample. Fetterman thinks that women are more attracted to this particular file manager because they see what it can do for them. The idea of "women's programs" does sound fairly sexist, but if we want more women to use the Color Computer, we have to examine those things of particular interest to women and computerize them. We also need to show women how "general interest" programs can be used for their specific needs: database managers, mailing list managers, word processors, graphing programs, music programs, bowling secretaries and spread sheets can all be "personalized." Your retail store manager and mail/-phone order personnel should be able and willing to take the time to show all customers how to adapt their programs for their customers' individual needs and likes.

As time goes on and the home computer becomes more the rule than the exception, we hope that more women will take an interest in the CoCo. And you women who are reading this article and thinking: "I have written programs," let us hear from you. Submit articles to *Rainbow*. Submit your programs for publication. Call the bulletin boards. Set an example for your daughters — and your sons. And for you women who are reading this article because your husband, father, son or boss insisted, we'll discuss CoCo widows next month.

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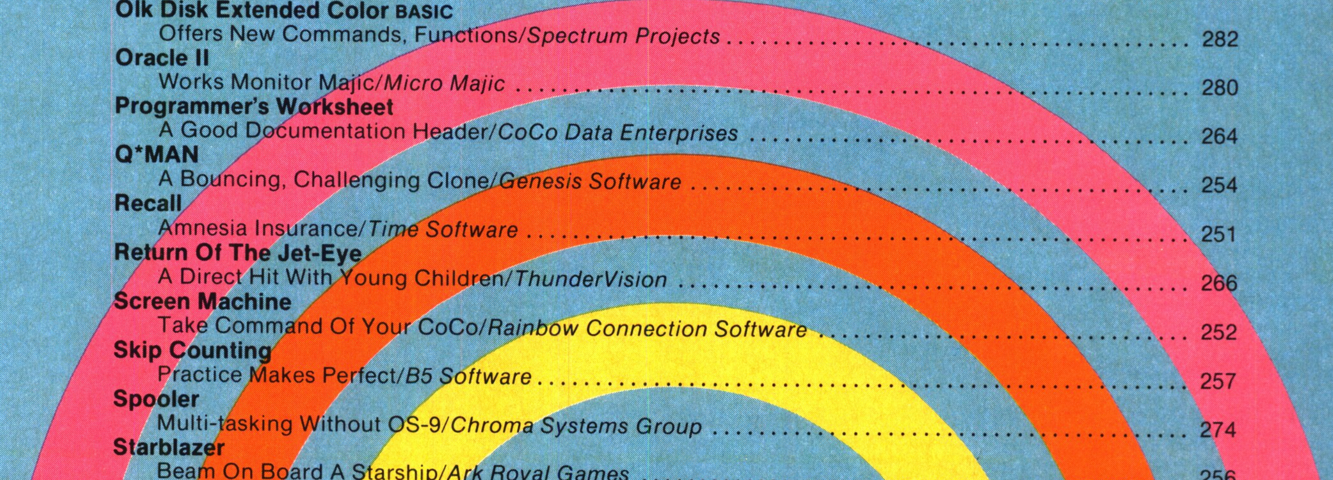

RECEIVED & CERTIFIED

The following products recently have been received by *the Rainbow*, examined by our magazine staff and approved for the *Rainbow Seal of Certification*, your assurance that we have seen the product and have ascertained that it is what it purports to be.

This month the *Seal of Certification* has been issued to:

Air Traffic Control, a simulator game for the Dragon 32 requiring one joystick. You are in charge of RPVs (remotely piloted vehicles) and must contain the RPVs within your radar area. Avoid mid-air collisions, while guiding in the aircraft on "finals." Points scoring makes this a competitive game for all age groups. Microdeal, 41 Truro Rd., St. Austell, Cornwall PL25 5JE, tape $28.95, disk $31.95

Bible Stories Adventure, a 16K ECB ML Adventure game. This is an adaptation of some of the best loved stories from the Old Testament such as Adam and Eve, Noah's Ark, Abraham and Isaac, Moses and the Exodus, and David and Goliath. Recommended for ages 10 and above. Sugar Software, 2153 Leah Lane, Reynoldsburg, OH 43068, $19.95 tape, $24.95 disk

Black Sanctum, an Adventure. The object of this spooky Adventure is to destroy the evil forces of black magic lurking in an old 18th century monastery. Mark Data, 24001 Alicia Pkwy., No. 207, Mission Viejo, CA 92691, tape $24.95, disk $27.95

Buying The Right Computer The First Time, by Pablo E. Silverio, a complete guide to selecting a small business computer. It asks questions, you fill in the answers, and the guide will direct you to the exact computer system to meet your needs. Also, it is a valuable tool for less experienced computer salespeople. Silma Data Research, Inc., 3647 W. Flagler St., Miami, FL 33135, available at computer stores and book stores. It is nationally distributed by Ingram Book Co. and The Distributors, $9.95

Color 80 BBS, a bulletin board program. It includes two diskettes (disk 0 and disk 1), software documentation, technical documentation, and hardware documentation. Silicon Rainbow Products & Logical Computer Products, 1111 W. El Camino Real, Suite 109, Sunnyvale, CA 94087, $150

Color Profile, a 16K program in which you can store nearly any type of data and retrieve it with a few quick strokes. You can design the way the screen displays your data and create reports that show you any information you choose. Includes up to 26 user-defined formats available for displaying data; 26 user-definable indexes per file; 10 levels of sequences available for record sorting, etc. Cat. no. 26-3253, Radio Shack stores nationwide, $59.95

Color Math Practice, designed to improve your basic math skills with the use of a 32K Extended BASIC computer. You have the choice of doing addition and subtraction problems or multiplication and division problems. All numbers and answers will be positive whole numbers. You will have up to three chances to get the correct answer for each problem. After three wrong answers, the computer will give you the correct answer. Jarb Software, 1636 D Ave., Suite C, National City, CA 92050, $28.95

Computer Cassette C-10, a blank C-10 length cassette with a five screw shell and free labels for the TRS-80 CoCo, MC-10, TI-99/4A, VIC-20, or C-64. Parallel Systems, Box 772, Dept. R, Blackwood, NJ 08012, 58¢ plus $2 S/H, any quantity (Canadian orders $4 S/H). Storage box, add 12¢ each

Computer Monopoly, a 32K program like the popular board game. The instructions assume a person is already acquainted with the rules and objectives of the game. Roll the dice, buy the property, try to own the whole board and make your opponent(s) bankrupt. Doug Keating, 6728 Mackey, Overland Park, KS 66204, $21

COMTEX, a menu-driven text compression utility program requiring approximately 24K and at least one disk drive. You must boot Flex before running the program. Gil Goodridge, P.O. Box 21, Merrimack, NH 03054, $29.95 plus $3 S/H

DISKUTIL, an assembly language program designed to make everyday use of your disk system much easier than using BASIC, along with additional features for your disk system. Silicon Rainbow Products & Logical Computer Products, 1111 W. El Camino Real, Suite 109, Sunnyvale, CA 94087, $35

Early Letter Recognition, a program written primarily for preschool children. It is neither a drill, nor a game, although an adult helper (parent or teacher) can make it into a game by prompting for specific letters by name, color, keyboard location, etc. The program is comprised of 26 graphic displays, one for each letter of the alphabet. The child can "call up" any display at will simply by pressing the corresponding letter key. Software Specialists, P.O. Box 2029, Princeton, NJ 08540, $12.95 or $19.95 for this and *Kids' Choice*

E-X-T-E-N-D-E-D Disk BASIC, an extension to RS-Disk Extended Color BASIC whose primary function is to add a new command line interpreter (CLI) which runs in parallel to BASIC's. This allows BASIC commands to work as before while allowing new commands to reside on disk. In addition to the CLI, 11 new commands, three new functions and a new directory command have been added to BASIC's built-in commands. Spectrum Projects, 93-15 86th Dr., Woodhaven, NY 11421, 64K disk $24.95 plus $3 S/H

The Final Countdown, a 32K ECB one-player talking Adventure game that must be used with an SC-01 based speech unit and the Del Software translations program *TRNSLATE*. You are outside a missile base, which has been evacuated because a berserk general has started the countdown on a missile. You must stop the nuclear missile from being launched and starting World War III. This program incorporates a special scroll routine which allows descriptions of rooms, objects and exit directions to be shown at the top of the screen and prevents this information from scrolling out of view as user commands are entered. Jarb Software, 1636 D Ave., Suite C, National City, CA 92050, 32K ECB, $24.95, standard cassette, $14.95

Froggie, a 32K race against time to get your "froggie" home. Get across the busy highway and then the river using logs, turtles and crocodiles to get you there. Escort the lady frog or gobble up the fly for extra points, but look out for the otter, he's your enemy. Spectral Associates, 3416 South 90th St., Tacoma, WA 98409, $24.95, diskette $28.95

GRAPHICOM, a graphics screen editor and communication package. It lets you create and edit graphic screens and send or receive them across phone lines or by amateur radio (SSTV), as well as dump them to a graphic printer. Cheshire Cat Computer Creations, P.O. Box 115, Lafayette, CA 94549, $30

Kids' Choice, a number recognition program. Three displays are associated with number key (except zero — the wild card number). For example, if the child presses 2, any of the following graphics might appear at random: a large number 2, two winking faces, or two American flags. There is an element of chance every time the child presses a number key. Software Specialists, P.O. Box 2029, Princeton, NJ 08540, $12.95 or $19.95 for this and *Early Letter Recognition*

Lancer, a 32K "joust" game. Your goal is to destroy all of your enemies as your bird maneuvers and flies around lava, dragons and deadly foes. Spectral Associates, 3416 South 90th St., Tacoma, WA 98409, tape $24.95, diskette $28.95

Learning Games, three 16K ECB educational programs suitable for pre-school to elementary grade school children (ages three to eight). *Shape Test* makes recognizing basic shapes fun using voice, color, sound, music and graphics animation. *Word Test* matches the computer spoken word with the displayed word. A correct response is rewarded with graphics and a song. *Count Test* — count the magic beeping marbles and see the surprise at the end. DD Software, 10 Simonne Lane, Pepperell, MA 01463, tape $24.95

MDCOPY, a utility for the disk owner who has moved up from a tape environment. Tape-based ML programs can be saved to disk with a minimum amount of effort from the user. While *MDCOPY* eases the first transition to disk, the second program in this package, *NODISK*, eases the long-term problem of program incompatibility. Sadre Software, P.O. Box 3891, Gaithersburg, MD 20878, $9.95

Ms. Gobbler, a 32K ML ECB maze-type game which includes four distinct mazes on a black background with moving bonus shapes. Ghosts of different colors and personalities all their own chase you around each maze and are deadly. Spectral Associates, 3418 South 90th St., Tacoma, WA 98409, cassette $24.95, diskette $28.95

Newbasic, a ML program that is tapped into the BASIC interpreter in a transparent fashion in order to enhance it. It requires an R/S disk controller, 64K, 1.1 Color BASIC, 1.0 Extended BASIC, and 1.0 Disk BASIC. *Newbasic* also requires an understanding of disk ECB and some programming experience. It is in semigraphics 24. This lets you use *Newbasic* commands to underline words in eight colors. Silicon Rainbow Products & Logical Computer Products, 1111 W. El Camino Real, Suite 109, Sunnyvale, CA 94087, $25

NEWERROR, a 16K ML program that provides four extra functions and abilities for your CoCo. It will: give you an audible error warning; provide full-English error messages; provide a means of branching to a specific line in your BASIC program should an error occur; and allow you to simulate errors in BASIC for debugging purposes when using the "ON ERROR GOTO" feature. The Dataman, Box 431, Sta. B, Hamilton, Ontario, L8L 7W2, tape $19.95 Canada, $16.95 U.S.

Remote Terminal Driver 3.0, allows a remote user to call up their TRS-80 home computer and operate it as if they were sitting at the computer's keyboard. It may also be used as a front end RS-232 driver for a bulletin board program written in BASIC. Silicon Rainbow Products & Logical Computer Products, 1111 W. El Camino Real, Suite 109, CA 94807, $30 in assembly language disk or tape

SEMIGRAF, a 16K graphics editor that you can use to create or modify a picture. You can create a picture just for fun, to use as the title screen for a program, or you can design a series of pictures to create a slide show for a business or educational presentation. It is written primarily in machine language, though the menu routine, including disk and tape I/O, is written in BASIC. Uses all eight available colors and supports semigraphic modes 8, 12, and 24. Sugar Software, 2153 Leah Lane, Reynoldsburg, OH 43068, $19.95 tape, $24.95 disk

Score-EZ, a one- to six-player game based on the popular Yahtzee game which requires 32K ECB and a Spectrum Speaker Speech synthesizer with translate software. The computer will take care of all score keeping, it will roll the dice and allow you to choose where you wish to place the scores you obtain. All prompts the computer gives are printed to the screen and spoken out loud. Jarb Software, 1636 D Ave., Suite C, National City, CA 92050, cassette $24.95, standard cassette $15.95

Space Shuttle, a flight simulator space Adventure for the Dragon 32. Your mission is to successfully pilot the shuttle through each stage of the "launch," "fetch," and "finals." After a brief weather report your shuttle is launched into space. You control the shuttle and attempt to maneuver into position to receive the malfunctioning satellite using the remote arm.

You must guide the shuttle down into the landing zone and attempt to land the shuttle without the use of engines in the White Sands Desert, using the radar assisted plot board. Microdeal, 41 Truro Rd., St. Austell, Cornwall PL25 5JE, tape $28.95, disk $31.95

Speed Reading, a 16K program designed to help you increase your reading speed by presenting reading material on your TV screen at speeds which train you to read faster, forcing you to push to keep up as material is displayed and removed from the screen. In addition to reading exercises using text material, a drill is provided which flashes numbers on a portion of the TV screen as an exercise to improve peripheral vision. This program will run with either non-Extended BASIC or Extended BASIC. B&B Software, P.O. Box 210, Jenkintown, PA 19046, $17.95

SPELL-A-TRON, a program designed to assist in teaching children how to spell with the use of a 32K ECB computer and a voice synthesizer using a Votrax SC-01 chip and Del Software's *TRNSLATE* program. The program allows the user to build a dictionary of words, with proper pronunciation as well as spelling, and then the test mode can be entered for use by the child. The program will both spell the word and say the word if the child is not correct. Uses only positive reinforcement and is user friendly. Jarb Software, 1636 D Ave., Suite C, National City, CA 92050, cassette with documentation $28.95

Storm Arrows, a 16K ML maze game. Maneuver your land skimmer though treacherous streets in an effort to evade and destroy deadly Storm Arrows and the relentless Pursuit Cruiser. Spectral Associates, 3418 South 90th St., Tacoma, WA 98409, tape $24.95, diskette $28.95

Swiss Army Knife, a ML general disk utility program. Its purpose is to allow you to analyze and change the content of any RS Color Computer Disk formatted in COLOR-DOS format. The Dataman, P.O. Box 431, St. B, Hamilton, Ontario LBL 7W2, five-inch disk U.S. $25.50, Canadian $29.95, three-inch disk U.S. $27.95, Canadian $32.95

Type Assault, a 16K ECB typing game based on the popular Missile Command arcade game. Stop falling letters before they hit your planet's surface. There are nine skill levels to choose from. As your score increases, so does your typing ability. Spectral Associates, 3418 South 90th St., Tacoma, WA 98409, cassette $23.95

The *Seal of Certification* program is open to all manufacturers of products for the TRS-80 Color Computer, the TDP-100, or the Dragon-32, regardless of whether they advertise in *the Rainbow*. By awarding a *Seal*, the magazine certifies the program *does exist*, but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to *the Rainbow's* reviewers for evaluation.

— Susan Remini

reviewing REVIEWS

VALHALLA

Editor:

We here at HYCOMP would like to thank *the Rainbow* and Tom Roginski for the fine review our program *Valhalla* received in the February 1984 issue. Mr. Roginski did mention what he called "the game's only flaw" concerning the use of more than two armies in battle. With games of the size and scope that we produce, we know there are bound to be differences of opinion concerning various aspects, such as the way battles are fought, etc., but I did want to state our view on the point he raised.

In all of our games we carefully consider such things as the way battles are won and lost, movement, and other mechanical aspects. We also strive to keep the playability and realism of the games intact while weighing all the different aspects of the game.

Another important limitation we have to work around is, of course, the memory restrictions, as Mr. Roginski mentioned at the end of the review. (The 285 bytes he said were left is more than most of our other games!) He stated that the principle of bringing all possible force to bear against a single point is of prime importance in war.

Although we agree with his basic premise, we also realize that simply throwing all your forces into battle to outnumber the opponent often results in disaster rather than victory. Instead of using the "brute force" method he suggests, we decided to employ a more strategy-oriented method for bringing force to bear against a single army. By placing your armies carefully and realizing the order of battle, it is possible to attack an enemy several times with different armies. Our method also gives an outnumbered opponent a fighting chance, which is necessary in any game of this type. Mr. Roginski used the history of war to back up his opinion but who can forget the few brave men in the Alamo who held off an overwhelming force or, more in the flavor of *Valhalla*, the 300 Spartans who defended Greece at Thermopolye against a horde of invading Persians under Xerxes.

Again, thank you for the fine review and keep up the good work!

Phil Hymer
HYCOMP Software

LOWRCASE

Editor:

Among the many instructions in the checklist *the Rainbow* gives its independent reviewers is the following:

"Be thorough and honest. Take a hard look at the program and if it's a dog, let's tell the world. But be fair, too. Just because it doesn't appeal to you, don't immediately condemn it . . . constructive criticism is best. How could it be improved?"

To my mind, that basically tasks us with trying to maintain objectivity at all times. That's not always an easy task, especially if one of your guiding philosophies as a reviewer is to assume the buying public's role.

"I know, I'll probably be accused of not giving this package a fair shake. So be it." So was it!

Judging by some of your reactions, at least as reflected in these pages in the last two months, that's just what happened after my review, of KRT Software's *Lowrcase* package for the LP VII and DMP-100 (December 1983, Page 262). I said, apparently too bluntly for many and for the first time since I've been doing reviews for this magazine (almost a year now), that the package wasn't "worth the money or the effort considering the product delivered." And that's where the disagreement comes in. Those of you who have taken the time to defend the product have done so fairly and knowledgeably. And I'm delighted to see that. Reviewers are not — and should not be expected to be — infallible. Our task is to try to let you know whether a product works, and then make a recommendation. Mine was based solely on my opinion of this product's worth to me while trying to project that feeling to others. Perhaps those of you who have chastised *the Rainbow* for printing the review do not understand our relationship with this superb magazine. In short, we are not employees of the magazine in any way. Yes, we are paid to do the reviews — barely just enough to cover postage and long distance phone calls in most cases — and, no, we do not end up with all kinds of free software. We are, in essence, volunteers given very short deadlines to tell you what we think. Our input is usually accepted for publication without any editing.

For those of you who either stated or implied that you now will look distrustfully on any review appearing in these pages, you are making a mistake. *The Rainbow* and its reviewers work hard to bring this service to you. The number of reviews carried herein has grown tremendously over the past few months reflecting the ever-increasing availability of software for our CoCo. But if every review were a mere trumpet (read "hype") for the product, then the reviewers and the magazine might as well be paid by the software company. Some magazines will not even publish negative reviews for fear of losing advertising revenue. In my opinion (again), those who can't stand the criticism should either clean up their product or bow out.

I have a feeling that something good has come out of all of this: The folks at KRT Software have gotten more advertising for their product than they paid for, and you, the consumer, have had a chance to hear opposing evaluations. I think that's good and healthy. As always with the software business, it still comes down to the same bottom line: if the product will do the job for you, then it's right for you. It wasn't and still isn't right for me.

I've gone on too long and this is starting to look and sound like an apology rather than an apologia. *The Rainbow* is the best magazine of its kind around. Its reviewers (including this one) try to be honest, objective, and informative in all cases. If, and when, we miss the boat, we'll expect you to let us know.

To Parsons Software: I agree, in retrospect, with your observation (Reviewing Reviews, January 1984) and disqualified myself from personally doing the followup review of your enhanced version of *Fundfile*.

To the gentlemen at KRT Software: perhaps you need to take a good hard look at the few words you use to explain your product's benefits. You obviously think very highly of it. If I, as some implied, missed the main point, how many others will? Think about it.

Edward Lowe
Gary Court, SC

ASTRO BLAST AND COLOR HAYWIRE

Editor:

In your Deccember issue, I was quoted as saying our software is not protected. Mr. Marlin Simmons rightly took exception to my comments in this column in the February issue. Mr. Simmons stated that our *Astro Blast* and *Color Haywire* cassettes are equipped with "auto-loaders" making them impossible to backup or convert to disk.

Actually, our auto-loader is so simple in concept that most people are not challenged by its presence and find making copies very easy indeed. I guess I never thought of this as a protective device. Its purpose was to provide auto-execution, not protection. I regret to say, however, since my statement appeared in the December issue we have found it necessary to add protection to our game software. Utilities and business programs are still sold without protection.

Ron Krebs
Mark Data Products

MICRONIX PREMIUM KEYBOARD

Editor:

I would like to comment on the terrible review Mr. Ed Ellers did on the *Micronix "Premium" Keyboard.* First, Mr. Ellers states in his opinion that the keys are a bit too high, but also states prior to this comment that the installation procedure is a definite plus. I'm sorry to say you can't have both. The center post in the middle of the keycase would have to be removed in order to make the keys any lower. We decided the easy installation would be more of a bonus, rather than having to tear the computer apart, just in order to get a new keyboard.

Secondly, I would like to correct the statement Mr. Ellers made concerning the ALPS keyswitches in our keyboard. The PC board is indeed made by Oak, but the keyswitches and keycaps are made by ALPS as stated in many of our ads. Mr. Ellers would have had no way of knowing this; unless of course, he had taken the keyboard apart, or contacted us. The ALPS keyswitches are great for our premium keyboard; it gives the keyboard that electric typewriter feel and smoother touch.

Thirdly, I would like to state that Mr. Ellers made a totally false statement when he said, "You can't save your redefined key codes, despite the instructions in the manual." Mr. Ellers was not using the software correctly because you can save your redefined keycodes. If Mr. Ellers [was] having problems, he should have contacted us and we would have gladly told him what he was doing wrong.

I have taken this opportunity to list a few statements made by some of our customers taken from letters received after purchase or from "The Comment" section of our warranty card.

—Fine product — great feel — pleased with it
—Far superior to regular type keyboard
—Excellent piece of hardware
—Both keyboard and software easy to install — works well
—Love everything — especially software
—Feel and appearance are great
—Keyboard feel — allowing for increased typing speed
—Color scheme, texture of keys
—Quality
—Expected performance without maintenance
—Low profile
—It's outstanding

Eva Barth
Micronix Systems

Editor's Note: The key code save problem was due to a misunderstanding of the instructions. We agree that our reviewer should have contacted Micronix. The keys are, indeed, made by ALPS.

JOURNEY TO MT. DOOM

Editor:

After reading Mr. Schechter's review of *Journey to Mt. Doom,* I felt I had to write and give my own viewpoint of this program. Unlike Mr. Schechter, I did not consider this program a "very good Adventure."

Compared to every other Color Computer graphics Adventure I have, this one stinks. Mark Data Products has just put out *Shenanigans* and a graphics version of *Calixto Island*; Radio Shack has carried *Sands of Egypt* for more than a year now. The Mark Data programs may not have been available to the reviewer, but certainly *Sands of Egypt* should have been known to anyone reviewing a graphics Adventure program.

My first criticism of *Journey* is that the pictures are crudely drawn. They look like someone fiddled around with *LINEs* and *CIRCLEs* until some kind of rough sketch came about. There is no perspective whatsoever, and indeed, were it not for the text description, it would be impossible to tell that this passage was filled with holes, or that room had mushrooms in it. Even a picture as simple as a passageway came out looking like some kind of modern art. The only room I could distinguish with any certainty was the picture of a stable.

Granted, pictures do not necessarily make or break an Adventure. The Scott Adams Adventures that have recently been released are excellent Adventures because they are well-plotted. They don't need graphics to catch and hold your attention. Infocom's *Zork* series are the best Adventures ever written, not for their graphics but for the lively prose and complex vocabulary.

But *Journey to Mount Doom* has none of these other saving virtues. Its plot is at times derivative, the descriptions, depending as they do upon the graphics for support, flat and uninteresting.

In addition to its other faults, *Journey* is slow. It is not (and this irritates me as much as anything else) the 32K machine language Adventure Tom Mix has advertised; instead, it is (as Mr. Schechter pointed out) a noticeably slow BASIC Adventure with a few machine language subroutines thrown in. Could you call the winning simulation, *WarGame*, a 32K machine language Adventure just because it used a machine language Hi-Res graphics character print routine and a couple of other routines? Of course not! In my opinion, this makes the "32K Machine Language" in the advertising extremely misleading.

Perhaps I am being too harsh on *Journey*. However, comparing it to other graphics Adventures available for the Color Computer, I have to conclude that it is a waste of money. Go buy *Calixto Island, Shenanigans,* or *Sands of Egypt* if you want a good graphics Adventure. Perhaps this will encourage the producers of *The King, Buzzard Bait*, and other excellent arcade games to either produce good Adventures or get out of that particular segment of the market.

This particular review has been only one of many reviews that have cropped up in *the Rainbow* recently written by someone who has little or no experience with the type of program they are reviewing. The most obvious recent examples I can think of are several arcade game reviews by people who have little arcade experience.

In many cases, however, you seem to stick a reviewer with a product and expect him to sink or swim regardless of his experience (or lack thereof) in the area in question. This may be most noticeable in *the Rainbow* because of the sheer volume of reviews you publish; even so, I would most strongly urge you to please, please, *please* take more care in who reviews what. While there is something to be said for the philosophy of letting an inexperienced user attack a program, in most cases, someone with more experience will be able to more accurately review the program. Even if a program is supposed to be used by an inexperienced person, user-friendliness and many excellent features cannot excuse errors in fact, poor operation, or cost completely out of line with the rest of the market, all of which has little chance of being caught or praised by a casual reviewer.

William L Harris, Jr.
Bourbonnais, IL

FILEBOX 16

Editor:

The documentation for Filebox 16 refers to a problem of hanging up for no apparent reason. Therefore, when I experienced exactly that problem while reviewing the program (*the Rainbow*, 3/84), I referred to it in a critical manner.

The problem may not lie in the program at all, however. Two or three weeks after finishing the review, I experienced problems with my disk drive operation which required significant realignment to correct. I subsequently used Filebox 16 several times and realized that there had been no reoccurrence of the hangups.

Therefore, it may be that the author of the program has a disk drive that is starting to go out of alignment. If so, the program deserves higher marks than it got.

This letter can also serve as a reminder to all of us — have your disk drives checked out periodically. Is there anyone out there who can tell us how to do this so we don't have to run out to our local RS computer center?

Warren S. Napier
Denver, CO

Design A Window Away With *MagiGraph*

The Micro Works has released a new graphic development program for experienced BASIC and assembly language programmers. It is called *MagiGraph*, and is well worth taking a look at if you use graphics within your programs and want an easy way to develop, test, alter and record them. This is especially true for the creation of game characters.

MagiGraph opens with a very attractive high resolution display which demonstrates convincingly the capabilities of the program (and the artistic capabilities of Kevin Dooley, the programmer). Pressing any key will access the "design screen," which works in the standard low resolution text-and-block-graphics mode. You have a "window" on the left of the screen which represents a solid color block. The area represented is four bytes across and 16 bytes down. A number of single-stroke keyboard commands move a cursor in the design-screen window and set the corresponding pixel in any color. Pressing [ENTER] will toggle the display to the graphics screen, where you can review the precise effect of your design screen work. This is necessary because the design screen's Lo-Res graphics can represent a number of different configurations on the graphics display, depending on the mode you select.

The program allows display in any of four graphics modes: G2C (2K color graphics — not implemented in Extended Color BASIC), G3C (3K color graphics — *PMODE 1*), G6C (6K color graphics —*PMODE 3*), and G6R (6K resolution graphics — *PMODE 4*). On the graphic screen, the design window you were working with appears as a rectangle, which can be moved around the screen so that you can "pick up" and alter any portion of the graphic screen contents. Any window-sized hunk of the screen can also be grabbed into a buffer and put back on the screen in another place. There are a total of 10 such buffers (one general purpose, and then nine numbered "animation buffers" designed specifically to store variations on a character for complicated game animations).

In the G2C mode, your design window represents a rectangle taller than it is wide, of roughly the same proportions as the representation on the design screen. When you switch to G3C, the window will be a square, so your design screen display will get squished in the vertical direction when displayed on the graphics screen. This effect is even more pronounced when you display your work in mode G6C or G6R, since then your window represents only $^{1}/_{12}$ the height of the screen while it was ¼ the height of a G2C screen.

Besides being able to set individual pixels in the design window, there is a very complete graphics editor for manipulating the window contents. There are commands for moving the contents of an entire row or column, or part of a row or column; rotating the entire window contents 90 degrees; and inverting the window to its left-to-right mirror image. The ease with which you could create a running-jumping-pounding-falling Mario (a la "Donkey Kong") in all his variations, is phenomenal! It's also very easy to check the smoothness of your planned animation by switching to the graphic screen and displaying the animation buffers one

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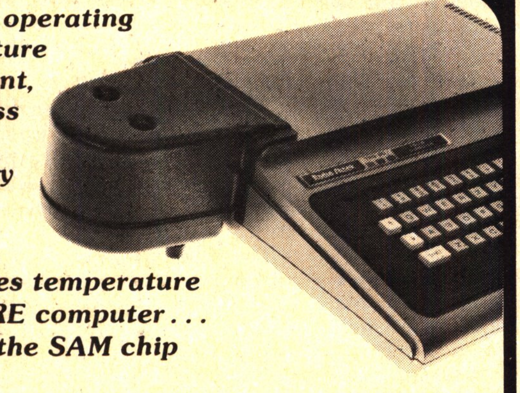

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after another by pressing the number keys in quick sequence. The program will not automatically cycle between the buffers — the actual animation has to be up to your final application program. Whether your program will be in BASIC or assembly language, the author provides some workable examples of animated applications. These sample programs are presented in the manual, and thus serve as a good lesson to the beginner — the assembly language example, while workable, is certainly not the snappiest animation routine in the world, but if you're just getting into assembly language animations, it's a beginning.

When you are displaying the graphic screen, there is a complete set of logical operations you can perform on the contents of the design window or the general purpose buffer in relation to the window area: you can *AND*, *OR*, or *EOR* (Exclusive *OR*) the window contents with the current background color; likewise all three operations can be performed between the buffer contents and the window, or you can *NOT* either the window or the buffer (as it's put in the window). If you're concerned about checking the results of these operations before messing something up, Mr. Dooley provides a complete set of tables detailing the effects of each operation on each color.

One of the most useful features for the assembly language programmer is the printing routine. Given the proper command, the program will dump to a printer a depiction of the design window (using initials for color names — G,Y,R, B,W,C,M or O) and the corresponding *hexadecimal numbers* for each byte! This means that a numerical table to describe a character or figure can simply be transposed from the printout to your application program.

MagiGraph is available on cassette, disk or Amdisk and complete instructions are included for upgrading from cassette to disk. One absolutely excellent feature of the program is that it automatically recognizes whether a disk controller is attached, altering the memory placement of the graphics area accordingly. This means that a graphic created using other programs (particularly BASIC programs or certain machine language programs such as *Micropainter*) can be looked at and manipulated by *MagiGraph*. And you don't need to worry about whether the picture was recorded with or without the disk attached, since *MagiGraph* automatically loads pictures from tape into the current picture area!

The only frustration I have with *MagiGraph* is that you are limited to working in the design window area, then moving it to work on another area of the screen. This is not a difficulty if you have other graphics programs with which to do your large scale drawing. I like to "rough-in" a drawing with the X-Pad, which has a tendency to be a bit inaccurate for doing fine details. I used to use *Micropainter* to "clean up" the drawing — it has a "magnification" mode which makes pixel-by-pixel corrections a cinch. Now I have the option of doing "clean-ups" with *MagiGraph*, with the particular advantage of the hexadecimal-dump printout.

The price may seem a bit stiff, but for a utility program of this power, it's a great buy for the serious graphics programmer.

(The Micro Works, P.O. Box 1110, Del Mar, CA 92014, cassette $34.95, disk $39.95, Amdisk $44.95)

— Paul S. Hoffman

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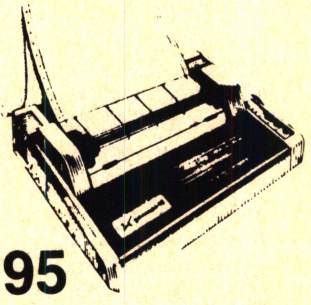

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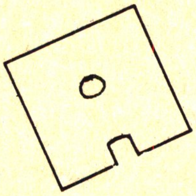

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Cheshire's *Graphicom* Is The Cat's Meow

By Paul S. Hoffman

I'd been looking for a good excuse to upgrade to 64K when I received the request from *the Rainbow* to review Cheshire Cat Computer Creations' *Graphicom.* As an artist and graphics programmer, I like to have on hand as many tools as I can: X-pad, *Micropainter, Art Gallery, Semi-draw, Magigraph, MPP,* Chromasette's *Drawer,* etc. Every program for creating on-screen graphics has its own advantages and features, and *Graphicom* is no exception.

First, a quick description: *Graphicom* is a disk-based program for creating graphics. You need a 64K Color Computer, one disk drive, and joysticks. Special features: "Rubber stamp" (for repeat drawing) any portion of a picture — as small as one pixel or as large as the whole page; a complete set of logical functions to manipulate the "stamp"; built-in printer dump and communication protocols; four 6K workspaces; graphic menu and graphic disk directory; easy formatting of picture disks without returning to BASIC; double cursor system (a keyboard-controlled block for text and a joystick-controlled cross for graphics); user programmable text characters — just draw them on a copy of the "Fonts" formatting page.

Although pictures are saved on a specially formatted disk that can't be read directly by other programs, special BASIC programs are included for transferring pictures between *Graphicom* format and standard *SAVEM* format. In other words, you can use *Graphicom* to create pictures for *any* application: BASIC programs and games, machine language programs and games, animations, etc. One program on the disk, "BIN>ASC," will create a BASIC program that builds a picture from a data file. BIN>ASC was written by Mike Ward and is in public domain (free). It can be read or downloaded from the Color Computer SIG on CompuServe. (Go PCS-126 and then enter the XA2 database, which the SYSOP, Wayne Day, has set aside for graphics —a lot of *Graphicom* examples are there, too.)

Listing 1 is a sample of what BIN>ASC will do. It will create on your screen, ready to be stored to disk, a copy of Figure 1, a graphic I created using just *Graphicom.* (NOTE: Don't try typing in Listing 1, you'll have a lot of trouble converting the stuff after line 168 to keyboard characters. The best thing would be to get it from the *Rainbow On Tape* this month or download it from the Color SIG on CompuServe — if I can get it uploaded before you read this.)

BIN>ASC differs from Fred Scerbo's "Graphic Screen Data Compiler" (*the Rainbow,* November 1983, p. 160) by being *much* faster — avoiding *DRAW* statements — and actually compressing the binary information. (It also differs in not being easily typed in on the keyboard.) The most detailed picture will compress to less than 6,000 bytes, although it might use more than one screen in its converted form prior to final display.

The controls for *Graphicom* could be extremely hard to use and frustrating, especially if your hardware configuration isn't just right. Let me elaborate: The program uses both joystick buttons, and just the stick on the right controller. There are a number of functions which require the left button to be *kept pressed* while manipulating the right stick, then momentarily press the right button. I can't fathom how I'd manage this if I wanted to use the superior Deluxe (Kraft) Joystick which demands to be used with both hands.

The owner's manual suggests mounting your two joysticks on a board with double-faced tape, or investing in a simple foot switch to replace the left button. The board would definitely work with "standard" joysticks, but I'd still have the dilemma of the left-handed button position on the Deluxe stick.

The best solution, by far, is the foot switch. Such a switch is supplied by Spectrum Projects, but must be purchased as part of its package (*Graphicom* and footswitch) and really is a necessary adjunct to this program. (I'd advocate saving some money by buying a Radio Shack cassette recorder foot switch for $8.50 and attaching your own five-pin DIN plug.)

I was initially skeptical about doing freehand drawing with this program, because the line-drawing technique is "rubber-band" style. You tap the joystick button to set a starting point for a line, then can see the line "stretch" from that point as you move the joystick. A second tap of the button "sets" the line. Obviously, this is *great* for all sorts of straight lines, at any conceivable angle, but a smooth, curving line must be done with many tiny segments: "tap, move a

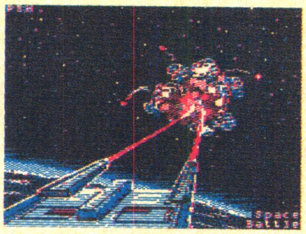

Figure 1:
"Space Battle" drawn completely with *Graphicom*

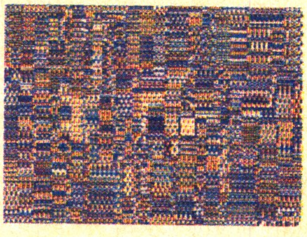

Figure 2:
Complex *Graphic* used to encode other pictures

Figure 3:
Encoded version of Figure 1
(Every byte of Figure 1 is *XORed*
with corresponding byte of Figure 2)

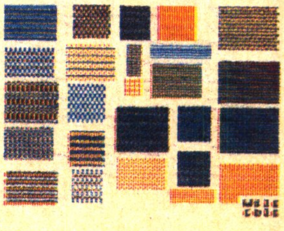

Figure 4:
Sample of colors possible in *PMODE 4*

little, tap again, then tap to start a new line where the old left off, stretch a little, tap, . . . etc."

Well, it's better than going pixel-by-pixel, as in *Micropainter*. In fact, with some of the other features, it's really not as tedious as it sounds. I did the "Space Battle" graphic just to see how it did, and was quite pleased with the ease with which everything came together.

The lines you draw with are either light on dark or dark on light — as in *PMODE 4*. There's no direct provision for drawing in two-pixel wide hunks to create the artifacted blue or red colors (or, for that matter, to create single-color lines in either of the *PMODE 3* color sets), but you can do it *indirectly* by creating a "pen nib" and "drawing" with that. The problem with that approach is that your pen point will move one pixel at a time rather than the two-at-a-time needed to maintain one color; the block you're drawing will alternate between the two colors as it moves across the screen. A better approach I developed for producing colored lines was to draw them first as thin, multicolored lines, and then overlay them with a logically manipulated "stamp" to adjust the colors.

The "Rubber stamp" is one of the major features of *Graphicom*. You can select any portion of any picture in your four workspaces as a stamp, and then select one of four "modes" for placing it on the screen. The area copied can be *ANDed* with the background, it can replace the background, it can be *ORed* or "e*X*clusive *ORed*." This gives an amazingly large range of possibilities.

The operation is graphically illustrated by flashing its effect prior to setting it with the button. This way, you can see the results before committing yourself to something irrevocable.

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An interesting suggestion is made in the manual that the "Reverse stamp can even be employed to encrypt a picture. One merely Reverse stamps some very dense, random pattern over the picture one wants to hide. This pattern becomes the key. Anyone having this key can Reverse stamp it over an encoded picture and (after lining up the key stamp properly) cause the decoded picture to appear." I tried this out by creating the extremely complicated jumble shown in Figure 2 as the encoding pattern. When that is Reverse *(XOR)* stamped over the "Space Battle" scene (Figure 1), you get Figure 3.

Decoding is tricky (it takes some fine control to get the coding stamp lined up properly), but really spectacular when this confusing jumble on the screen *suddenly* breaks forth into a glorious graphic!

One of the four workspaces is available also as a storage space for a "Stamp Set." If you pre-define a stamp SIZE, you can have a full screen of stamps which can be selected quickly from this page. The drawback is that all of the stamps on a single page have to be the same size.

Any individual stamp can be rotated in 90-degree increments or mirrored top-to-bottom at any time. When you consider that the stamp size is completely flexible, this makes the possibilities practically infinite. The kind of color-effect patterns possible with overstamping (using various modes) is depicted in Figure 4.

The second outstanding feature of *Graphicom* is the series of functions referred to by the "com" in the title *Com*munication. Although the BASIC programs that convert pictures to binary or ASCII format are not strictly a part of *Graphicom*, they are supplied on the program disk, and certainly do increase the user's ability to communicate graphic material. In *Graphicom* itself are three communication routines, one for RS-232 link-ups over a simple modem, one for Slow-Scan TV over short wave radio and the third for taping or communicating through an experimental "cassette modem." Both the SSTV signal and the cassette signal can be taped, but neither coding of a picture is loadable in other programs. They do function quite well within the *Graphicom* environment.

I haven't tested the RS-232 routine, since I haven't been able to link-up with another *Graphicom* user, especially within the short time I had to crank out this review. One caution: the RS-232 routine will *not* work with a "smart" modem such as the Hayes. You need a simple "on, off, originate" switchable modem such as Radio Shack's Direct Connect Modem I.

You are always working within a 64 by 64 pixel "fine control" area which corresponds to the resolution of the joystick. This is not a drawback, as the area moves across the page when the cursor hits a border. There is a limitation if you are continuously stamping something (using it as a pen nib or paintbrush). In those cases, you cannot shove the fine control area when you reach a border. This makes large-scale brush strokes hard to do.

The only things missing in *Graphicom* are a magnification mode for fine detail work, a "clear screen" routine and a "paint" (area fill) routine. You can effectively "fill" irregular areas by stamping a pattern into the area and using repeats of smaller and smaller portions of the pattern to reach the edges. Similarly, large blocks can be stamped over a picture to wipe it out.

I do rely on the magnification mode in *Micropainter* a lot, and would suggest you use *Disk Micropainter* (see last month's *Rainbow*) to do any really fine, pixel-by-pixel work on pictures created with *Graphicom*.

If you're going to move pictures back and forth from program to program, you're going to have to create Binary saves of *Graphicom* pictures with the "GC>BIN" program on the disk, since the *Graphicom* workspaces don't coincide with the usual BASIC or *Micropainter* graphics memory.

The 32-page manual seems to be "quick-copy" printed on standard 8½″ x 11″ paper and is stapled at the top corner. It could really benefit from a simple binder and some additional proofreading for misspellings. Other than that, it does an excellent job of explaining the program's features.

All in all, Marty Goodman at Cheshire Cat has come up with an outstanding piece of software — Bravo! It's available from a number of distributors, including Spectrum Projects, MichTron, Moreton Bay Software, Shooting Star Software, Bee Color, and Radware.

(Cheshire Cat Computer Creations, P.O. Box 115, Lafayette, CA 94549; Spectrum Projects, 93-15 86th Drive, Woodhaven, NY 11421; MichTron, 1691 Eason, Pontiac, MI 48054; Moreton Bay Software, 316 Castillo Street, Santa Barbara, CA 93101; Computize, Inc., P.O. Box 207, Langhorne, PA 19407)

The listing:

```
10 GOTO10000
40 CLEAR200,&H5DFF
100 FOR X=&H7E00 TO &H7E28
101 READ H$:POKE X,VAL("&H"+H$)
102 NEXT
103 DATA 8E,5E,0,10,8E,E,0,A6,80
,A7,8D,0,1D,A6,80,A1,8D,0
104 DATA 17,26,B,E6,80,A6,80,A7,
A0,5A,26,FB,20,2,A7,A0
105 DATA 10,8C,26,0,25,E5,39
106 FOR X=&H7E60 TO &H7EC3
107 READ H$:POKE X,VAL("&H"+H$)
108 NEXT
109 DATA BD,B3,ED,1F,3,33,41,EF,
8D,0,5C,8E,E,0,10,8E
110 DATA 5E,0,86,8,A7,8D,0,4D,86
,6,A7,8D,0,46,6F,8D
111 DATA 0,44,A6,80,80,30,48,48,
48,59,6A,8D,0,36,27,1C
112 DATA 6A,8D,0,31,26,F2,E7,A0,
C6,8,E7,8D,0,27,6D,8D
113 DATA 0,24,27,E4,31,3F,1F,20,
BD,B4,F4,39,86,6,A7,8D
114 DATA 0,12,A6,80,80,30,48,48,
AC,8D,0,B,25,D2,63,8D
115 DATA 0,4,20,CC
116 PMODE4,1:PCLS1:SCREEN1,1:AD=
&HE00
140 READ A$:IF A$="!" THEN GOTO1
60
141 FOR I=1 TO LEN(A$)
142 POKE AD,ASC(MID$(A$,I,1))
143 AD=AD+1:NEXT I
144 GOTO140
160 DEFUSR0=&H7E60:E=USR0(AD)
161 PMODE4,1:PCLS1:SCREEN1,1
162 EXEC&H7E00
163 FOR I=1 TO 5000:NEXT I:CLS
164 PRINT"FILENAME FOR PICTURE:
";
165 LINEINPUTF$
166 F$=F$+"/BIN"
167 SAVEM F$,&HE00,&H25FF,&HA027
168 END
169 DATA"mW'1I_H8013f2@0<mP@03?H
506IVI_H900cf3@0<mPD0ISQnmQd0O"
170 DATA"1aVmQ'0461VIPKf3P30mPd0
H3aV1_H8013fDP0HmTh0<?H>063f10"
171 DATA"030'06mPd00H3f201PmPD00
oH?0063mQ100oHC033f7001P?H401S"
172 DATA"f3P0HmP@0H?H@01Sf3@0'mQ
'00OHJ006000000h3f6@01P000007f"
173 DATA"1'1PmQ<00oH;063f4'03mP@
00oHO00?f9'0<mPh0H?HC00?f2'1Pm"
174 DATA"PL04?H9063f>010000HmQ'0
@0006?HI00'4mQd04?H700cf8006mP"
175 DATA"\0'?H9063f5@30mPH00H00H
?HF00J000060060mQ40<?H600J0000"
176 DATA"6mPh03?H<00:'mQh00X3f1@
0'0000H?HK0300033f5P0@mQ102?HC"
177 DATA"00cf2'07P?HI00401P00043
f2'0@0000'?H9007f1@2000014006m"
178 DATA"PP0@<3f3'2@0007'0060000
'?HE0>0003T'mPD0'?HG007<B?H@00"
179 DATA"H00004mPP00Q4HmQ@0@0000
0@00100?XolmQP01000ka1SVOcf2P0"
180 DATA"1P000033f1'1000014l1W<L
;f2'300000<?H700@000MC4GHoa_H6"
181 DATA"004001Sf40094UiOoiof1P0
1mQ<02G<'[oolP0K0mQL02IYU_onDP"
182 DATA"NPlmPl00H3f1P08?OUooln2
00?0mPh00@06mPD03:]4Coa^R000<?"
183 DATA"HF001QTD><iPP0000PmQH0n
@'o6LH80000^000063f4P24nCoaO>'"
184 DATA"0002h0000H?H40<01P?H;09
EP4010^No00;Sf5P2=0>'CT>eLH00P"
185 DATA"mQH0oD2h742i5B008001P?H
@00400042kndAkEk'00040H3f4'04B"
186 DATA";jh3TfC20001?H5063f2@30
000@00O00^_\L'I6C?H<007f1@3000"
187 DATA"001QPh28jhQ4::V?H<007f2
@0J82LPRnnSobKlmQH0>j00RRk\iWn"
188 DATA"N4?HD00o'8?oRf82io7BWi?
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HD01]08_hcQR3]oW2>400000?f400m"
189 DATA"12b76Lb0<_mga5000001mP1
00O0HOR<''P08o9@UN?H;013f1'06'"
190 DATA"0BIo'R6>PonmBA4mQ<00'00
\_'02Zh8R1hQ50001_H>00L03000P_"
191 DATA"hPn[XZ;YgTA0001_H@03P00
@S1R8Z^ZXRI0Gcf2'10mPL020017oh"
192 DATA"R:[XZ81T0@?HC02P00KH8R:
ZXZXXhPA3f4'2P008XXR:[YFXPn83f"
193 DATA"4'1PP0028P08Z^_8XoR0mPh
0@?H701<^P0:[_^8;n83f1@06mP'0L"
194 DATA"0X000Hn20RZj1R3n8000006
00Cf3@0:P03k>281jkkH0o_f500>P0"
195 DATA"3=<>b>>[9VPo7f5006003E<
;XQ^_^h0:7f5'2A1^b>K_kVP0;f5'3"
196 DATA"GL[XQ^_^h8Q[f5'2A7^b8K_
kjR;;f5'1e@P8SZo>nX?cf5'0AENR8"
197 DATA"ZnInR^Sf5'0?408S[iRnX0W
'mQ400OH504@02;mP_XZ94?HG01028"
198 DATA"[nJ^R544?HG04@8P?QP^83e
j?HE03000082hR:j8<]TmP@00@0H00"
199 DATA"30mP\0<00028:0R?R014Cf1
001P004mQ000iXR8WP4H5kf6001Z8P"
200 DATA":N1\>oOHI0:0P8[0F3TGf10
0<mQ<00Z28O;07i5Gf6002P212n02E"
201 DATA"6oHH00X00HVc7oahmQP0:00
12k145A00007f5@2P0033_1A6D0004"
202 DATA"?HD00:P0033_OP7h?HG00Z0
001j_oSf3'0HmPT0:P@000;m4?HI06"
203 DATA"P00002m53f2P04mPh0X0000
0K@H?HH00:P00000\n0mPX0@?H=00Z"
204 DATA"000000X03P000@?HD02[f10
02P?H40400'?HB0>P000'02X3f6002"
205 DATA"X000300:P?HH00:PmP@02X3
f600:P?H400Z0mQP0:_H501[f6001Z"
206 DATA"?H501[f6002X?H500[f400@
mPL02Z3f1@0[mQP0:h3f1@0[mQP0j_"
207 DATA"H602[f5@10002XmPH0:P1Pm
PT0E?H;00J'mPH0:_HG01Z0mPH0:_H"
208 DATA"G02Z0mPH0Z_HG0:[f1'2ZmP
\0EE4@mPP00jcf1'2XmP\0EOH:00ZP"
209 DATA"mPL0Z?H?014@mPD0>^3f1P0
1Z?H;053f2@03jX3f1'2\mP\0EDA5E"
210 DATA"?H601oZmPL00[cf2'1ED001
ED011400mncf1'07W?H;05EEEECf1@"
211 DATA"03'G3f1'0<9_H70400001gE
EE1EED@000?of3f1'0=@_H;0=gMEEC"
212 DATA"f1@0mM6000001000062;f2'
1gMgMeEEE@003anN3f1'0J@P0hmPT0"
213 DATA"mPCMe@05EE?7A>E4mPH0=aK
f2'3f17MEEE003eo<'?H703AFmPX0@"
214 DATA"?H4gOMeEE01M@30mPL0I=Kf
2'3f17MMeEE0mOhCP0004A00001mE_"
215 DATA"H;0?H4gOMmeEOCE0Kf2038]
_H;0?coMgMMegMOCo5MEDA0mPD0g@C"
216 DATA"f2'1_oogMoggMO3e06?H700
6@Q?H<0>ogmgGGMoGoQGEEEEE00000"
217 DATA"0EE<mP\0@93Yommmgm>E4>E
EmPD04A<SC?H;014081Oeggm?OP7Em"
218 DATA"PAE4A@00RE<mPd0A4GoooPM
DEMeEOH600IcG?H>014G4N5ol@OMeE"
219 DATA"EED00000A4C?H;04Cf1007e
OE5GgM'ookf100=O]cf1P0@mP@0g]f"
220 DATA"aDA4>1mlD7MgGomOf15EHA0
cf2'0Wo_P0A7UOm51gMgOE0eE0000M"
221 DATA"oYSf2'0GOP'00?AYFEGooMo
nEeEEEE@@QATAmPX0A4MfA4N1oo51d"
222 DATA"AmgEEOMED00<OdHmP'04A01
7UOEAE:4AookEgMeEEEe5ASf2'14A4"
223 DATA"00?@loU@IP45EEEmgME@11n
aSf2'0A004@h7EEE1eFeOoUEgMeEEE"
224 DATA"G4Ae@0DCf2@04@0>EooaEGo
okm@E7oooooX;k6?H;014A4Ah0001@"
225 DATA"7oomofE1mPCoe55hmP\0@00
0CP00053oonmDAEOf1?14mgeED?H90"
226 DATA"1OA4A]EEA@AOodMoEE5mPAE
1E@'00EEA43f1P3gO4@8802DeoooOe"
227 DATA"5D7oH4oe_eMEEE@?H808h60
F'EEE@7EGCeie@EGoooDPe0?MGf2'1"
228 DATA"UK?00001_ooWoEEAooooomE
o1MeEEE?H801000m00001eEeOo]EIE"
229 DATA"mEEEE1E0?OMED0A5DA7f101
011mELoH4onoEED7f1?omO11gGEEEE"
230 DATA"ECf1'0A?EA5EEgoeAonmD5E
EEEMD000OoOgmPT0@07eDIof1?mmDE"
231 DATA"E7mPCok'00MOgMEE3f1@300
14CeDGf15EDOoOE9EOoooE5005]OoO"
232 DATA"L0014A?H504mE5?H4ooWeAE
EOmPCo'?dEH'?MMEEEA?H5011mE57f"
233 DATA"1EGOgEDEmPEEDAATWOOOME3
f1@0H@?EEKoH4onoa5EEomPGoniAP0"
234 DATA"GUeeEEE@040000CeE4EmPAE
7OimD5Gf1@0A5?A4Comm'?H604m5AG"
235 DATA"3f101oEEEEo_H501LD1@08O
MMEE?H503aE54EEAEEDMO_EFE@0005"
236 DATA"EE1D@h0A4AgggmPH0mEACWo
nJZZ\00ED7o:ZZZOohUeCa400fOeeD"
237 DATA"??H40<EAAEED@001D5GEQE0
0005EFPAEI000AOogg6I1?3'1EDDLo"
238 DATA"odZZZUEEADOX5EEEooa;UE3
HCLa7med>6H6H6IEEE5ED0001EEEE1"
239 DATA"EAEEE5EDm4EDAN0N45om'LI
SiPO5DDkooP0006EED0OnOf1?o\K5G"
240 DATA"A4N0OTEmdIVIVH61DDAEEEE
D015EEE=M5mPAEDEAA'0ALaH01g3al"
241 DATA"?S'1DFmomPCo_UEE0OoOmPC
ok]aE'@000400001P0000AACf1EED0"
242 DATA"01AG1Gf15E@DE?4A4A6A4@0
0600000EN?H50?iE00Oo?oH4olRiDl"
243 DATA"000A0P07'0<30h05Cf1UED0
03EmPME4E74@004000V?7Qh63aCmPW"
244 DATA"oOokf1@01^E7GdA4A4A011S
0'66I5mPUEeOH7EE5EP3'4A0009Sh'"
245 DATA"<1Q1WoHAog5ETA?03H009VH
1?1QPmP]EeOH6EE51]4AdA7a403hH6"
246 DATA"3'1mQ7oo^EEX0014@N0mPH0
mQ5EE4E1]4A4A41PmPH00"
247 DATA"!"
10000 PCLEAR6:GOTO40
```

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JFD-COCO Disk System A Good Buy But It *Is* Different

By Ed Ellers

The first accessory that a new CoCo owner decides to buy is very often a disk system — when and if one can afford it. The people who buy IBM PC and Apple II systems take it for granted that they will be using disks and disks alone, but with low-cost computers like the CoCo one often decides that a tape recorder will do just fine. Until the first few I/O Errors, that is. That's when the disk bug strikes with a bite that's almost as painful as the cassette problems.

Radio Shack wisely decided not to freeze out the outside suppliers of disk systems and other goodies for its computers; the various TRS-80 models are quite amenable to use of non-Tandy equipment. While I won't name names here, some other computers' inability to accept disk drives from "aftermarket" firms has left many owners of those machines quite angry.

Like a number of other companies, J & M Systems has marketed a controller package to add disk drives to a cassette-based Model III or 4. J & M has more recently introduced a disk controller pack for the CoCo, as well as several different disk drive units. I should note that, although controllers and drives are usually sold as a package, the J & M controller will work with Radio Shack's CoCo drive units, and the R/S controller will work with the drive units that J & M sells.

The Drive Unit

The disk drive unit that came in the package I received for review is a single disk drive in an aluminum case. The drive itself is a Tandon Magnetics TM 100-1, which is the drive that Radio Shack used to sell for the Model I and III and is used in many other computers as well. J & M has nicely installed this "bare" drive in a sturdy case along with a power supply called a Trans Power I. J & M also carries what is called a half-height drive, which lets you put two disk drives in the same case that is used for a single drive. The Trans Power I has holes on the board for power and data/control lines to a second drive. (To convert an existing one-drive unit to two half-height drives you must remove the old drive, and you then have no way to power both it and the new drives off the single power supply.)

The Tandon drive differs from the older Radio Shack drive (made by Tokyo Electric Company, a division of Toshiba) in that it is a 40-track drive and has a faster stepping rate. Radio Shack's earlier drives were said to be 35-track units, but were actually capable of 37 tracks. (The Tandon drive can really handle up to 43 tracks.) The stepping rate (the time it takes for the head to move to an adjacent track in either direction) is given as 30 milliseconds for the R/S drives; Tandon's unit has a much faster 5 ms time, which speeds up disk operation considerably. (Although Radio Shack obviously won't service the J & M drive, they *do sell parts* for Tandon drives as well as a service manual; ask for the manual for 26-1160/1/2/3/4 and specify the Tandon version.)

The Trans Power I circuit board, in addition to having an

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on-board power supply, also extends the drive's edge connector to the back of the case. Some aftermarket drive units force you to take the cover off the case to insert or remove the drive cable, but the J & M does not.

An unusual feature is that the drive selection function is done by a jumper in the drive unit instead of by leaving out pins in the cable as Radio Shack does. The drive comes with a cable that has all the pins in place on both ends and doesn't have to be inserted only one way. (This cable has a connector for only one drive unit; if you get a dual-drive system, only one connector is needed because both drives share the connector on the board.)

Instead of being mounted vertically as Radio Shack's CoCo drives are, the drive unit has the drive mounted horizontally, so you insert a diskette with the label side facing up.

The Disk Controller

J & M's package includes their own disk controller pack, which plugs into the cartridge slot on the CoCo in the same way that Radio Shack's controller does. The controller will work on the Color Computer 2 as well as the earlier Color Computer and TDP System 100. It is well made, with gold contact fingers and an aluminum case. The controller even has four arrows to show which way to plug it in, a white line to show how far to insert it and a notice telling you to turn off the computer before unplugging or plugging the controller into the CoCo. It has no internal adjustments (unlike Radio Shack's controller, which has a few trimmers that require an oscilloscope for proper adjustment).

JDOS — The Disk BASIC ROM

Understandably, Radio Shack does not sell large quantities of Disk BASIC ROM chips to other controller manufacturers. Because J & M could not count on a steady supply of the R/S ROMs, they decided to write their own Disk BASIC; while they were at it, they added a number of new commands:

AUTO: This command (which is available on the Model I, III and 4 lets you enter BASIC program lines at a specified interval without having to type a line number each time. After you enter a line, the computer will go to the next line number automatically.

DOS: This command (which Radio Shack included in the Disk BASIC 1.1 ROM, but not the 1.0) boots OS-9 from the system disk without having to run the boot program and change disks.

DSKINI: This command was changed to let you format a disk in either Radio Shack's format or in a special format used by JDOS. For the JDOS format, you would type DSKINIn,s,t, where n is the drive number, s is the number of sides (1 for a normal drive or 2 for a double-sided drive) and t is the number of tracks (35 or 40) that you want to use. You can't use a non-standard number like 37 or 43, however.

ERL, ERR, ERROR: These functions (also inspired by the Model I/III/4) let you perform error trapping in a BASIC program, somthing that the CoCo normally can't do. ERL gives the line number in which the last error occurred; ERR returns a code that tells what the error was, and ERROR lets you set up a branch to an error-handling routine.

FLEX: This command boots FLEX directly, just as DOS boots OS-9.

RAM: This command (which only works if you have a 64K computer) copies the BASIC ROMs into the second bank of RAM and switches to the 64K mode.

RATE: Since J & M's drives (and others on the market) are

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capable of a faster head stepping rate, this command will let you change the step time to match your drives. The options are 30 ms (for Radio Shack drives), 20 ms, 12 ms and 6 ms (which works with the Tandon drive I mentioned). You can't set different step rates for each drive, so if you are using, say, one Radio Shack drive and one Tandon unit you can only use 30 ms.

RUNM: This very nice feature lets you load and execute a machine language program from disk with one command; you can now *RUNM"ZAXXON"* instead of having to *LOADM"ZAXXON/BIN":EXEC.*

JDOS was originally written to provide the same BASIC commands as Disk BASIC 1.1., using the *Color Computer Disk System* manual as a guide to the forms of the various commands. After JDOS 1.06 was released, a number of users told J & M that it would not accept a number of command forms that were *not in the manual,* but that Disk BASIC would accept anyway. J & M has released JDOS 1.07 as a version that accepts all known Disk BASIC commands; as with all such guesswork, it's entirely possible that there are things about Radio Shack Disk BASIC that J & M hasn't found out about yet, so if you find that your favorite trick doesn't work, this may be the reason why.

The most controversial aspect of JDOS is that it is an entirely new program, not merely a modified version of Radio Shack Disk BASIC. J & M says that programs using the DSKCON routine in ROM (which is patterned after the one in the R/S version) for all disk I/O calls will work. Programs that try to access undocumented machine language routines in Disk BASIC will not work because the routines are completely different.

One program that just plain won't work, interestingly enough, is *Telewriter-64*. Even the new version (which uses DSKCON for all disk I/O) simply will not start up at all. When I called J & M, they told me that they and Cognitec had determined that the problem was in the way that *Telewriter-64* is loaded into memory and set up for your particular machine's configuration; it seems to overwrite memory locations that JDOS uses internally. Since Cognitec and J & M could not overcome the problem, J & M has come up with another answer; they have arranged with Softlaw to include *VIP Writer* free with the purchase of a drive 0 system (a drive unit, controller and JDOS).

If you don't think that you can put up with the minor problems of JDOS, you can put something else in the controller's ROM socket. J & M told me that the JFD-COCO controller will accept Radio Shack's disk ROM without any problems, and that they will sell their system with it in place of JDOS. You can even "burn" your own disk I/O program into an EPROM (a Motorola MCM68766 is the one that JDOS comes on) if you are proficient in 6809 assembly language and have access to a PROM programmer; if you are so inclined, J & M will sell you the system without JDOS for $20 less.

The final question is whether the J & M system is a better buy than Radio Shack's drive 0 system. That depends on a number of things. Radio Shack is now selling its drive 0 system for $399.95. J & M sells its system (with one Tandon drive, JDOS and *VIP Writer*) for $449. At first glance, it would appear that the J & M system costs about $50 more. J & M's system is capable of higher performance than Radio Shack's — if you use JDOS (or something else other than R/S Disk BASIC) as your operating system. With Disk BASIC, you will get exactly the same operation from the J & M system as you would if you had a Radio Shack system to begin with. If you don't want a complete drive 0 system, but only want a controller pack (to use with drives that you obtained separately), the J & M controller (with a Radio Shack ROM or with JDOS) may be easier to get than a Radio Shack controller by itself.

It boils down to this: J & M's JFD-COCO with JDOS has more features, more disk space and faster operation; Radio Shack's package runs everything and is $50 cheaper (if you leave *VIP Writer* out of the equation). Everyone's needs are different, so what I would pick may be entirely wrong for another. With that, I leave the decision to you.

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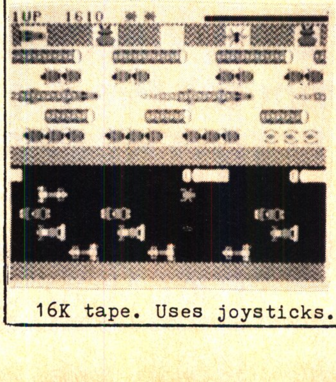

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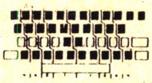

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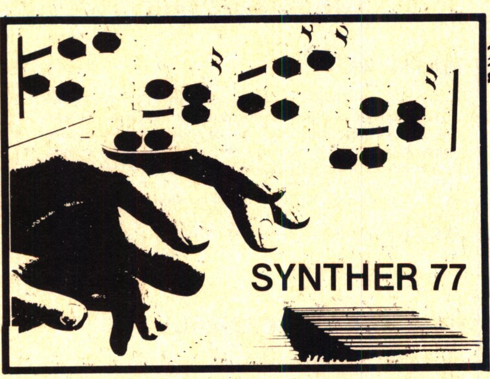

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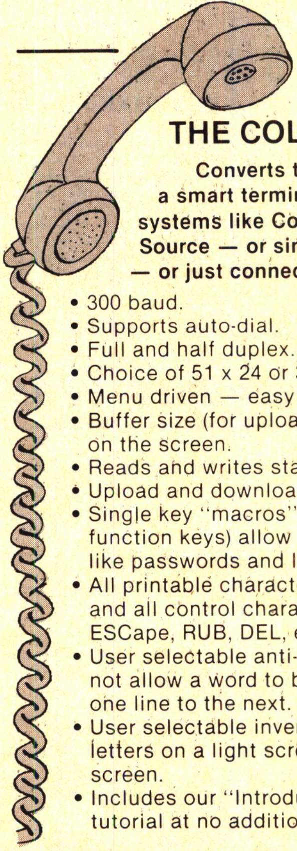

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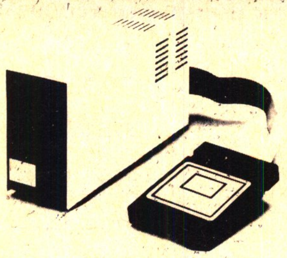

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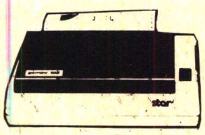

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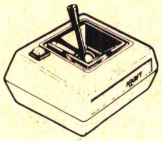

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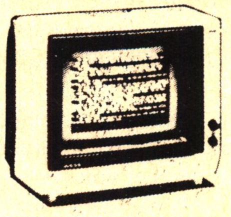

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Colortac Checks Speedy Disk Drives

Colortac is a rather straightforward program that performs exactly as advertised. This neat utility is a disk speed checker for the 32K Extended Color BASIC CoCo. You will remember from the disk drive specifications sheet that the drive is designed to rotate at 300 rotations per minute (RPM), plus or minus a small tolerance. So what? Well, depending on how much "out of whack" your drive is, you might not be able to initialize a disk, or in extreme cases, you might not be able to read from or write to the drive. Unless you take it to the repair center right away you may go crazy trying to figure out the problem. That is, unless you have a program like this one to pinpoint the problem.

Obviously, a program like *Colortac* is only a diagnostic utility that is designed to allow you to catch any drive speed problem before it reaches the point where the drive is not usable. The name of the program is derived from *Color Tachometer*.

When you run this BASIC program, you are presented with the usual "title" page and then, after a brief pause, each letter on the title page is changed rapidly so that it displays all of the alpha, numeric and graphic characters, creating quite a display that lasts only a few seconds. Then you are asked which drive you want to check. You may choose drives zero through three. Once you have made a choice, you see why the tachometer variation is appropriate. The screen displays the drive that is being checked, displays a line graph with an arrow pointing to the current speed, the current RPM, the average RPM, the highest RPM, the lowest RPM, the percentage of error (compared to 300), the number of times the speed has been checked, a message telling you whether the speed is okay and a message that you can go back to the beginning and start on another drive by pressing [ENTER] or exit the program by pressing [SPACE BAR]. That sounds like a lot to be on the screen at one time, and it is, but it is displayed very neatly. Here's an example of how the screen looks:

```
          *******COLORTAC********

          DRIVE # 1 BEING CHECKED

       290    295    300    305    310

  -----+-----+-----+-----+-----+-----

RPM  NOW: 299.52        %ERROR  : -0.16
AVG  RPM : 299.19       #CHECKS : 255
HIGHEST  : 299.56       LOWEST  : 298.35

            SPEED IS CORRECT

          HIT [ENTER] FOR PROMPT.

          HIT [SPACE BAR] TO QUIT.
```

Each of the items is rewritten after each check so that it really does give the appearance of a tachometer. It appears that the program will continue to check the speed indefinitely; however, you are warned not to let the program run too long or the head and/or disk may receive more than the usual amount of wear. This warning also applies to using [BREAK]. This will allow the drive to continue running and

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cause undue wear. To end the program, hit the [SPACE BAR] or just press the reset button. If the speed is greater than 298 but less than 302, you are told that the speed is correct; greater than 295.5 but less than 298 = speed too slow; less that 295.5 = much too slow; greater than 302 but less than 304.5 = speed too fast; and greater than 304.5 = much too fast.

How useful is a program like *Colortac*? I must confess that I do not have a Radio Shack disk drive (mine are BASF 6106 drives), so I called a Radio Shack repair center and asked about the incidence of drive failure due to speed problems. I was informed that it is a very rare occurrence but that it does happen. The technician told me that the RPM check is the first one that is performed when they calibrate a drive. How far off can the RPM be before you have read/write errors? He said that the tolerance is almost 10 RPMs either side of 300. If you do find that the speed of your drive needs to be adjusted, what do you do? *Colortac's* distributor tells you to "refer to a service manual or find someone who is qualified to work with live electronics." The advice is timely because the drive must be adjusted while it is running and the cover is off. Not only might you ruin your drive, you might also harm yourself from electrical shock. For those who are experienced, daring or just foolish, there is a picture on Page 294 of the November 1983 *Rainbow* of the Radio Shack drive with the cover removed and a diagram pointing out the location of the potentiometer that must be adjusted until the spinning register marks appear to stand still (the location of the register marks is pointed out also). All that is required is a small screwdriver, a fluorescent lamp and some patterns.

The documentation for *Colortac* consists of one 8½" x 11" page that was typed on a RS Line Printer VII. It's somewhat confusing initially because you are told to either run *Colortac* in the normal manner or by using Menu. A directory check showed that, indeed, there was another program on the disk, entitled "Menu." No further mention is made of this program in the documentation and it was a real chore to figure it out. I finally listed the program and found that it is another utility program that reads the directory of a disk, displays up to 42 filenames on the screen and allows you to run, copy, rename, offset, kill, execute and find the address of ML programs by moving an indicator with the arrow keys and then hitting the first letter of the operation that you want to perform on that file. Later I found this program advertised for $24.95. So you can run *Colortac* by running "MENU" first, then selecting *Colortac* to run. I'm not sure why a sane person would want to do this, though.

The documentation informs the user to check drives right after they are turned on (before they heat up). It is also suggested that the AVG RPM is the most accurate indicator of RPM. You are also told that you can change the drive being checked while the program is running simply by pressing the number of the drive to be checked. If you select a drive that is not on-line, the program tells you "DRIVE #n IS NOT AVAILABLE."

Colortac is an excellent disk drive speed checker. I feel it is modestly overpriced, but may be worth the cost to the hacker who will actually calibrate the drive if it needs it.

(Sunshine Software, P.O. Box 15686, Panama City, FL 32406, 32K Disk Extended BASIC $14.95)

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Peek Into The MC-10 With *Microdis*

One way to look inside a computer without removing the cover is to use a disassembler. A disassembler is a program designed to examine the code stored in the computer's memory and decode it into the instruction called mnemonics used by assembly language programmers. It can all be very confusing if your only experience with microcomputers is limited to BASIC, but a disassembler can be a tool which helps break that barrier into the mysteries of machine code.

Microdis is a disassembler written specifically for the MC-10 Micro Color Computer. The MC-10 requires a unique tool for disassembly because it uses a 6803 microprocessor which has a somewhat different instruction set (and capability) than that used with the 6809 found in the CoCo. *Microdis* is written in machine language and loads into the MC-10 using the undocumented *CLOADM* command. After typing *EXEC,* you are asked if you would like the disassembled output to go to the screen or to a printer. You must then provide the starting memory address for the disassembly. This is required in hexadecimal notation.

The output of the disassembly, whether to screen or printer, is several tabular columns of code. The first is the hex address, followed by hex data or instructions stored in that address, then the mnemonic instruction followed by the operand associated with the instruction. This output comes 13 lines at a time to the screen, then pauses until you hit a key. Being written in machine language, *Microdis* does its work very quickly.

Small size was an obvious design requirement for this program; *Microdis* achieves this admirably by occupying less than 2K of memory. Of course, with this small size, features which can be helpful in decoding a program have been left out. One useful feature missing is an ASCII column which can be used to identify tables of text and data strings embedded in the code.

The instructions for *Microdis* are somewhat sparse, particularly considering that many of the potential users will likely be beginners. There is no description of the output format nor is there mention of where *Microdis* loads into memory (4400 to 4BFF). This is important to know to minimize conflicts with programs being disassembled. It also would have been useful to include a brief description of the 6803 instruction set and mnemonics.

In summary, *Microdis* is a compact and fast program that provides BASIC disassembly of machine code for the Micro Color Computer. The very limited instructions, important for a program of this type, distracts somewhat from it's usefulness for beginners. This should not discourage a veteran programmer who may be looking for a small, fast BASIC disassembler for the MC-10.

(Micro Ten Software Co., 496 Amboy Ave., Perth Amboy, NJ 08861, available on cassette for 4K MC-10, $19.95)

— Tom Szlucha

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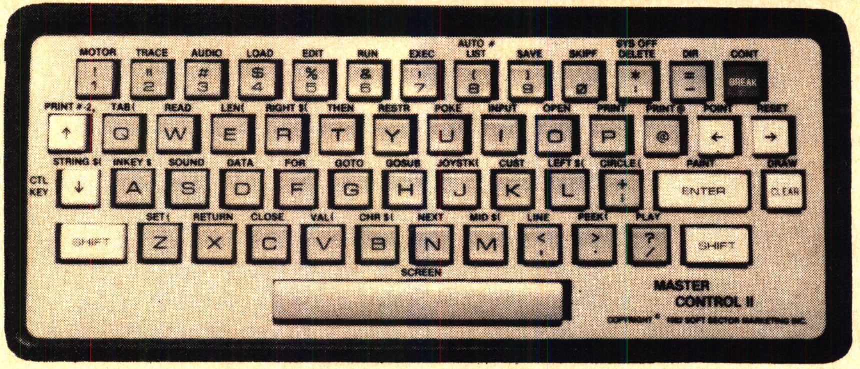

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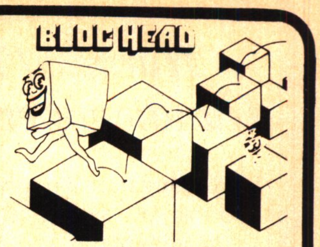

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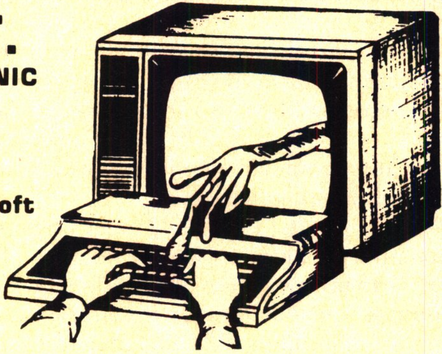

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Software Review

Harness/Thoroughbred Handicapper Is Good Trainer

I have long been a person who would be willing to make a bet almost any time — especially when I thought I would have the advantage. I reviewed all three programs in *Rainbow* on blackjack, a specialty of mine. I play blackjack and poker as often as possible. One of the reasons that I did not usually bet on the horses is that I did not know what to do to get the maximum opportunity of winning. Like their *Blackjaq* program, the two *Handicapper* programs from Federal Hill Software give the novice in a "game of chance" a chance of survival.

The *Handicapper* programs are two separate programs, one of which has the means to rate the horses in a harness race and the other in a thoroughbred race. These two programs are similar and require the 16K CoCo. There is a version on one side of each tape for the Standard BASIC version and on the other side for the Extended BASIC version. The only difference between the sides is the Extended BASIC version has a little graphics and music at the start up. After I had used these programs for a few times, I tended to use the Standard BASIC version which starts up a little quicker without this introduction.

The documentation for these programs is above average for appearance and clarity. When I first started to read them, I found that I knew even less about racing than I thought I did. To find the data required by these programs you need a paper like the racing form for the thoroughbred version. Some of the big city papers may also have sufficient "data." The papers for the harness version were not available in my town, therefore, most of the results obtained to date are for the thoroughbred races.

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Being rather naive about this game, I thought that all you had to do for a racing form was go down to the local newsstand and pick one up. That might be true in your town, but in Reading, Pa., it ain't so easy. I started out one Christmas vacation day about 11 a.m. on my quest. After going from one suggested place to another (and getting deeper and deeper into the seamier side of Reading) I concluded that this was a popular sport! Perhaps not the sport of kings, but very popular. The racing forms get to most of the newsstands about 9 a.m. and are all sold out by about 10:30 a.m. There is obviously a story here waiting to be written which is outside of this review. I took to leaving money in advance for my papers rather than get up almost at dawn (which is 9 a.m. during a vacation).

When you are armed with your first set of "data," you are ready to begin. At first glance I was a little confused as to how to enter some of the items. The solution to this was simple. I read the documentation. This tells you not only how to bet but when not to.

There is a total of 13 items to be entered in order for the program to score a horse's rating in the next race. Included in these are: time at the half mile of the last race for this horse; the time at the finish; and, if this horse did not win, the distance behind the winner. After a little practice, it took less than 10 minutes to enter these data on the most promising horses. When you are finished, the computer quickly lists the horses and their rating. While what you will do about these data is left up to you, it is suggested that you bet the highest scoring horse to win and place (that is for first and second positions). If your horse wins, you win both bets; and if your horse comes in second, you win the second bet which will about break you even.

Now the results! For the 42 races which I handicapped, I ended up with a modest win. In addition, I ended up much better than my own picks or a random pick of the races. The random pick was better than my effort because it picked one long shot, but did much worse than this program. Remember, the law of averages is a long war, indeed. The 42 races I used for this test is much too small a sample to determine the actual odds using these programs. Unlike blackjack, where the actual odds are possible to calculate (although the calculation is a very long one), there are too many variables in racing to ever calculate the true odds. It does appear that these programs are a useful aid to the racing fan. I know that I will use them in the future and will be going to more races in the future and not just on paper like these were.

One of the good features of this program is the listing of clues of when not to bet. Several examples: don't bet on horses in low-priced races or any horse on a wet track. If you eliminate as many of the races as you should, you will be betting only about half of the races. This will take will power. It would be easier if you can bet in some of these horse parlors — either some of those legal ones called OTB in New York or some of the other kinds. If you know of such a place near Reading, Pa., please write me with an address. All of those missing racing forms must be going somewhere!

Federal Hill Software, 825 William St., Baltimore, MD 21230, 16K BASIC for either the *Harness Handicapper* or the *Thoroughbred Handicapper*, $24.95 tape, $29.95 disk. Both programs $30.95 tape or disk)

— Tom Roginski

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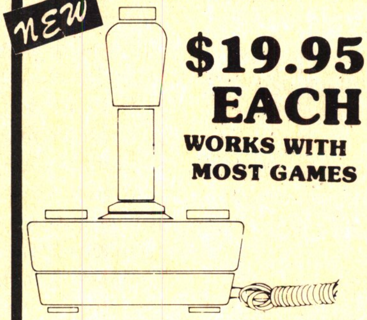

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Investigate Higher Math Skills With *Integral Calculus*

Radio Shack's newest entry in its "Secondary Level Math & Science" series, *Investigations in Integral Calculus*, does an excellent job of introducing important concepts of integration. For those of you who have forgotten your calculus, or perhaps never took it, the integral of a function $f(x)$ from A to B is the area under the graph of $y = f(x)$ above the x-axis, from $x = A$ to $x = B$.

Investigations in Integral Calculus is an innovative approach to teaching calculus. Guided by a set of carefully prepared worksheets, students run a computer program, and discover important facts about calculus.

The program is of the high quality we have come to expect from Radio Shack. The student starts by entering the function to be analyzed. To do this, he or she types a BASIC-style function definition, like Y = SIN(SQR(X↑2–8)). For students who don't know BASIC, the manual gives complete explanations of how to write function definitions, and numerous examples. For beginners, this can be a useful first step in learning BASIC.

After entering the function, the student selects the lower and upper limits of integration and the number of intervals. This last determines the accuracy of the calculations. After a pause for calculations, the program displays a high resolution graph of the function, and the approximate value of the integral. The program then displays a menu, offering the choice of changing the limits of integration, changing the function to be analyzed, re-drawing the graph, or terminating the program.

The program calculates the approximate value of the integral by using the Trapezoid Rule. With this method, the area to be approximated is filled in with trapezoids (rectangles with triangles on top). Since the area of a trapezoid is easy to calculate, it's relatively easy to calculate the areas of all the trapezoids, and so the approximate value of the area. The number of trapezoids used is the same as the number of intervals selected by the student, and naturally the larger the number of intervals the more accurate the approximation.

The program works very well, and is well-documented and easy to use. The trapezoid rule calculations can be time consuming, however. The calculations for one example in the manual required over two minutes. Fortunately, a blinking cursor lets you know your calculation is progressing during these long program runs.

There are two minor problems with the program that should be corrected in the next version. First, one of the worksheets asks the student to calculate an integral repeatedly, just varying the number of intervals. Unfortunately, the program menu doesn't offer "change the number of intervals" as one of the choices. The choice "change the domain" allows the student to select the number of intervals; this should have been explained in the manual. The second problem occurs if the student makes a syntax error in defining the function to be analyzed. When this happens, the program stops and gives an appropriate error message. Unfortunately, the computer is now in lowercase mode, so the student must type [SHIFT] [O] before typing *RUN* to restart the program. This isn't explained anywhere in the documentation, and it really should be, since failure to shift can lead to a frustrating series of SN Errors.

Along with the program you get a notebook with instructions for running the program, and a set of 14 investigations, in worksheet form, which use the program to explain important concepts of integral calculus. The first investigation explains the idea of integration, and explains how the Trapezoid Rule is used to approximate areas. The program is used to demonstrate the effect of increasing the number of intervals. The next 11 investigations lead the student to discover the basic rules for evaluating integrals: integrating powers of x, sines, cosines, exponentials, and linear combinations. The two final investigations give a summary of the rules learned, and a series of review exercises.

Each investigation begins with a series of numerical integration problems to be solved by using the program. The student is then led to discover the rule behind the problems, and then do some more problems to verify the rule. The investigations do an outstanding job of leading the student to discover the rules of calculus. For example, Investigation 5 shows that the integral of x from A to B is $(B^2)/2$. It leads the student to discover this by calculating the integral for various values of B, and then writing the answer in "halves." When the student sees that for $B = 2$ the answer is four halves, and for $B = 4$ the answer is 16 halves, it's easy to discover the general answer of B^2 halves.

Some of the questions require hard thinking. For example, after the student discovers that the integral of $1/x$ from 1 to B is the natural logarithm of B, the investigation asks why we never attempt to integrate $1/x$ from -3 to 2. The answer is that the problem involves division by 0, and this requires that the student really understand the problem.

Investigations in Integral Calculus gives an excellent introduction to some important topics in calculus. It's certainly not intended as a complete calculus course; the documentation suggests using it for a one- or two week-unit at the end of a precalculus course or the beginning of a calculus course. Also, *Investigations* presents a numerical approach to calculus, rather than a theoretical approach based on limits. This is appropriate for its intended use as an introduction at the high school level.

Any high school with Color Computers should certainly buy a copy of *Investigations*. The topics are carefully chosen, and the individual investigations very well-written. Any student working through these lessons will start the study of calculus with a solid introduction.

Should you buy *Investigations* for use at home? The worksheets that teach calculus are meant to be used only once, and you may consider the package too expensive for a one-time use. However, if you have a use for the program beyond working through the worksheets, it's an excellent choice.

Finally, some technical details: The package comes with both cassette and disk versions, and requires 16K Extended Color BASIC for the cassette version and 32K for disk. It's compatible with the Radio Shack Network 2 system. The worksheets may be duplicated for class use, and answers are provided on separate sheets. Prerequisites for the students are like those for any calculus course: a solid background in algebra, and familiarity with trigonometry, logarithms, and exponential functions.

(Radio Shack stores nationwide, Cat. No. 26-2641, $39.95 tape and disk)

— David Finkel

the RAINBOW's

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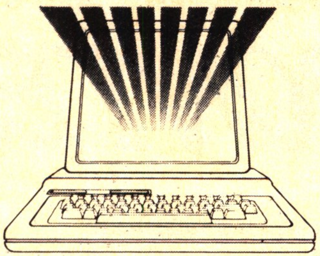
SUPER SCREEN



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The PRINT @ statement is a valuable asset to the programmer when formatting text on the screen. The standard Color Computer will report an error if you specify a location higher than 511 but Super Screen allows locations all the way to 1223! You get a big screen and a powerful formatting tool as well. Of course, Super Screen also supports the CLS command allowing you to clear the big screen using standard Basic syntax.

ON ERROR GOTO

That's right! Super Screen gives you a full implementation of ON ERROR GOTO including the ERR and ERL functions. Now you can trap errors and take corrective action to prevent crashed programs and lost data using the same standard syntax as other computers. The ON ERROR GOTO capability overcomes a serious deficiency of Color Computer Basic and greatly improves your capability to handle sophisticated tasks. All well written, 'user friendly' programs use error trapping techniques and yours can too! Now that's power!

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No more frustration as you edit a long line in your Basic program; just hold the space bar down and automatically step to the desired position in the line. Need a line of asterisks? Hold the key down and auto repeat will give them to you. Those of you who spend many hours at your keyboard will appreciate this outstanding addition to Super Screen's long list of impressive capabilities.

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This accounting software equals or exceeds higher priced packages for other computers and includes a detailed operating manual.

Requires 32K and a Single Disc Drive
PRICE: $99.95

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Color Designer
Makes *DRAWing* Easy

Many people purchase and use the Color Computer specifically for its high resolution graphics capability. In particular, the many graphics commands and functions built into Extended Color BASIC make computer artistry a straightforward task for the programmer. But straightforward should not be construed as meaning "simple." The Extended Color BASIC dialect included no less than 14 different graphics commands, most requiring multiple input parameters. Drawing even a simple picture or scene requires meticulous attention to detail. For the most part, each individual element or line in the picture requires an individual command (unless drawn with an indexed loop or other such algorithm requiring additional time to develop). This results in several dozen lines of BASIC code to draw each scene. In addition, a sketch on appropriately scaled graph paper is often required to define position and scale parameters correctly. With all of this attention to detail, creativity is stifled. Don't get me wrong, Extended Color BASIC is terrific; but there are many times that a graphics editor is a more appropriate piece of software to develop screen displays.

Color Designer, a recent software offering from Color Connection Software, is such a graphics editor developed to overcome many of these problems. When this software is used, the color screen is set up as a sketchpad. Working with a small blinking cursor, which can be moved about with the arrow and several alpha keys, the major Extended BASIC functions can be emulated. Individual pixels can be set and reset. Lines, boxes, and circles can be drawn or erased and you can *GET* and *PUT* pieces of graphics from one area of the screen to another. These functions are provided through a series of easy to understand commands, most associated with the current cursor location. For instance, [D] [ENTER] draws a trail on the screen wherever the cursor is moved. [M] 10,20 [ENTER] moves the cursor to screen coordinates 10, 20.

Some of the more complex commands require the use of auxiliary points. These points are "dropped off" at appropriate locations around the screen. They support the line command as endpoints, are used as endpoints of the diagonal in the *BOX* and *GET* command and are used with the *CIRCLE* command to define the radius and center. One thing to keep in mind with a program of this type is the need to learn a new set of commands and their associated syntax.

Learning this new command set is aided by the inclusion of a very detailed instruction booklet. This 26-page manual is well written, starts simple, then develops the more complex topics in considerable detail, including many examples along the way. In addition to the manual, a one-page summary sheet is provided which briefly describes each command. Also included with *Color Designer* is an excellent "Demo" program which has nine different full screen pictures, most drawn in considerable detail.

Along with the various drawing commands, *Color Designer* includes a *FILL* command which functions like a more powerful version of Extended BASIC's *PAINT* command. *FILL* allows the painting of objects not only with solid colors, but with an almost infinite variety of checkerboard, hatch, crisscross, and striped patterns in a mix of the available colors. This command allows the creation of patterns which simulate colors not normally found on the Color Computer through a process called "artifacting." This is done by using a machine language routine to fill the graphics memory with specific bit patterns, repeating the patterns over and over. The theory behind this process is described in the instruction manual which also includes a table giving parameters needed to generate specific patterns and colors.

The edit mode is a subset of features provided by the main menu. The main menu allows a series of housekeeping commands to save and recall graphic screens to disk or tape. Also allowed is the ability to change to other graphics modes. With some minor modifications, the program can be used with any of the graphics modes support by the VDG chip including those not used by BASIC. Also included, in the 32K version, is a subroutine call to a screen dump to be supplied by the user for the specific printer interfaced to the CoCo. I think that it would have been nice to at least supply the source code for a DMP-100 printer screen dump, but these routines have been previously published in *the Rainbow*, so they are available with some searching.

Color Designer is supplied with both a 16K and 32K version on tape media as well as a tape version with instructions to transfer to disk. The program is also available on disk. The 32K version allows a few additional functions, most notable, an *ELLIPSE* command and inverse, which flips background and foreground colors.

It is difficult to create and design a complex program of this type without incurring a problem or two. This program appears to be free of major bugs but there are two related items that I will be critical about. Being written primarily in BASIC, cursor movement is slow. I realize that there are methods in the program to jump the cursor from one position to another but this partially defeats one of the primary uses for this program; that is, the sketchpad —wherever the cursor moves, you draw. In a related gripe I wonder why a joystick cursor control option was not built into the program. It seems to me that a keyboard/joystick cursor option would have been an intuitively obvious feature for this type of program. This should be seriously considered as an upgrade in future revisions of this program.

With these minor exceptions *Color Designer* is a very complete and proficiently written piece of software that I would not hesitate to recommend to someone in the market for a graphics editor. It is function packed and a good value for the price.

(Color Connection Software, 1060 Buddlea Dr., Sandy, UT 84070, tape $26.95, disk $28.95)

— Tom Szlucha

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Calixto Island: Outstanding Graphic Adventure

Much of the pride that we as Color Computer owners share can be attributed to the fact that the base of knowledge about our computer's real potential is yet to be realized. I personally am amazed at the number of innovations that have been made during the past year.

I was reminded of this recently after loading a high-resolution, graphic version of Mark Data's classic *Calixto Island* into my machine. It was enough to keep me, my wife and eight-year-old son glued to the computer for an entire weekend and two week nights before finally conquering this marvelous Adventure game.

The only thing I can compare this family experience to was when color television first became popular a couple of decades ago. Remember how everybody sat in front of the TV for hours, as much to experience the sensation of color than for whatever happened to be playing at the time? You wondered how you had endured plain ol' black and white for so many years.

As far as playing Adventure games, I have rarely found much satisfaction with them because, up until fairly recently, the graphics have been pretty primitive. I mean you can only type "Go North" or "Go South" so many times without any visual satisfaction before it gets old. And how could an Adventure game possibly hold a candle to such games as *Buzzard Bait* or *Junior's Revenge* for an eight-year-old?

Welcome to the world of fully-detailed, super-color graphic Adventures!

And for entrepreneurial programmers, welcome to a whole new market. Those of us who have ignored, even derided non-graphic Adventure games for so long will love you if you can come close to matching the performance of Mark Data in reviving *Calixto Island.*

All of the scenes you could only imagine in the vintage version — the secret laboratory, the Mayan pyramid, the professor's house, the attic, the basement, the secret passageway — all are here in living color, along with Trader Jack and the other folks with whom you need to co-exist.

The commands are much the same as in other Adventure games, but it is so rewarding to see a different scene when you "Go North" or "Go South" in the graphic version.

In *Calixto Island* when you "Drop" or "Put" something down, all you have to do is check the screen in the appropriate location where you left it, saving you hours and many restarts in some cases. This is not meant to indicate that *Calixto Island* in the graphic version is easier to solve by any means. There are situations in which people and things disappear and reappear when you are least expecting them.

Events seem to be a lot more natural when you are aided visually, however. Some Adventure games I have played were too often an exercise in trying to read somebody's mind — a difficult task even when you have known someone for years.

Remember the "save" feature of the original version of *Calixto Island?* It's here, too, and fascinating to see when you reload the game and are transported back to the same place where you had to take a break. It's helpful, too, if you sense that you are in dangerous territory and want to keep a save on hand, just in case you don't want to go back to the beginning. You must first load the commercial version

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before *CLOADing* a saved version.

As in the original version, there's also a "Score" command if you want to keep track of the number of moves.

If you need assistance, there's a "Help" command. But don't expect too much. Common sense really is your best guide in this game.

As in most Adventure games, there are treasures, diversions, creatures and mysterious clues in *Calixto Island.* But they are more vivid and realistic in full color. About the only thing missing in this version is a voice feature, but then it really would only be appropriate in rare instances. Until voice capabilities are available at more reasonable prices, we can live without them.

I still find it difficult to believe that our entire family was mesmerized with the graphic *Calixto* for five days. It is that good!

All CoCo owners should applaud Mark Data Products for making graphic Adventure games available — and even on cassette tape. Those of us who have been looking for levels of involvement with our computer will be rewarded many times over as graphics are added to other older Adventure games and as still other new games are introduced.

Calixto Island reflects the quality that is so obvious in many Mark Data creations. You owe it to yourself and to your personal CoCo to enjoy this new Adventure in quality programming.

(Mark Data Products, 24001 Alicia Parkway, No. 207, Mission Viejo, CA 92691, tape $24.95, disk $27.95)

— Charles Springer

Air Traffic Controller — A Fun, Realistic Simulation

As a pilot I have visited some FAA radar control facilities for familiarization. I was always intrigued by the problematical nature of controlling a number of aircraft safely in an instrument flight environment. Now, with Tom Mix's *Air Traffic Controller* program for the 32K Color Computer, I am able to simulate a high density ATC environment, juggling arrivals and departures on up to two runways.

After loading and running the program a title screen is displayed and there is a short musical interlude. Then you are asked to enter your initials and select a difficulty level from one to five. The number of arrivals and departures you must handle is a function of a difficulty level; you get two arrivals and one departure for each level of difficulty. Higher difficulty levels also provide a higher wind velocity to cope with. The arrivals are all randomly placed in your control area. Departures are displayed on the right-hand side of the screen.

When the game screen appears, you see your traffic control area with the airport in the center. Arranged around this main display are various informational displays. Across the top are wind direction, time, and error displays. The error display tells you what goes wrong when you make a mistake, like allowing an inbound aircraft to exit the control area. Below the control area is an aircraft information block which will give you the speed, altitude, heading and inbound/outbound status. You decide which aircraft's data is to be

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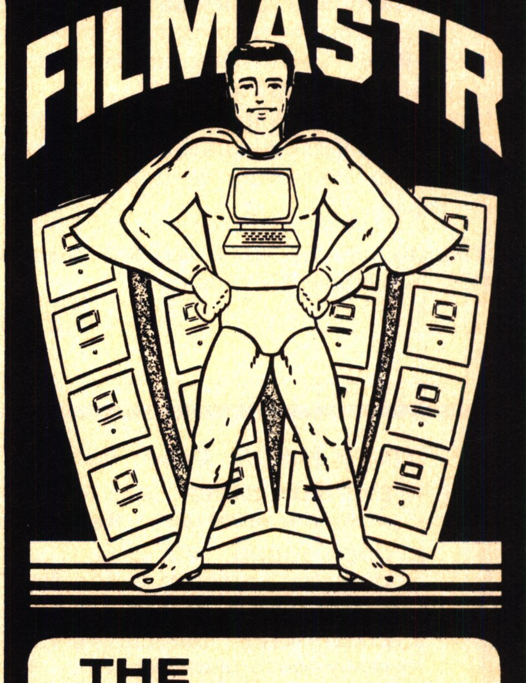

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displayed by positioning a cursor over the aircraft using the joystick. At this time you may also change any of that aircraft's flight parameters. In this manner, you update each aircraft's instructions and vector them around the control area for approach, departure and traffic avoidance. The wind direction varies from game to game so you are not always faced with the same problems.

The next two displays are unique. In this simulation we are dealing not with piloted aircraft, but with remotely piloted vehicles. This brings two unique aspects to the simulation. First, there are no pilots in the planes themselves to "look" for other traffic and avoid it. If we give two planes directions that will put them on a collision course at the same altitude, they will robotically fly right smack into each other. Thus, you must be very careful about what you instruct the planes to do. Second, in a real ATC environment, the controller vectors the planes to a point called the outer marker, which is always about five miles from the runway threshold. Here the pilot takes over complete control of his aircraft and completes his approach and landing using instruments in the cockpit. In other words, the controller has finished his responsibility for that plane. But in this simulation we have no pilots to complete the landing, so we must do it ourselves with the joystick. Using a side view glide-slope display and a combination rate of descent-lateral drift display, we navigate the planes, one-by-one, to safe landings. (If you miss the runway, the plane explodes realistically.) The landings are tricky, especially in crosswinds, and add tremendously to the fun of this simulation.)

After all arrivals have landed and all departures have taken off and left the area, you are provided with a scoreboard which displays the five highest scores. Scoring is a function of time elapsed and number of aircraft handled successfully.

This one is completely joystick controlled.

Documentation is complete and well presented. A suggestion: learn this one by running it at a low level and making mistakes. Refer to the documentation and learn by doing; it quickly becomes second nature.

This one rates an A in my book. It is realistic and fun. There is also something aesthetically pleasing about a group of aircraft proceeding in an orderly fashion to landings while others depart.

(Tom Mix Software, 3424 College N.E., Grand Rapids, MI 49505, $28.95 tape, $31.95 disk)

— David Johnson

Software Review

Cubix Is A Pyramid Of Fun

Cubix is one of the most popular games that has ever arrived at our house. My 18-year-old son and 12-year-old daughter gave Cubix the "Hogan Seal of Approval" shortly after playing it several times each. They both informed me that it is an excellent imitation of a game they play at the arcade. *Cubix* received their highest rating — "Dad, this is a great game." Staying power is the true sign of approval for a CoCo game. After a month, *Cubix* is still the game they are playing when they are playing a computer game.

Provided on tape or disk, *Cubix* requires 32K but does not require Extended BASIC. A joystick is also required. I reviewed the disk version. After typing *RUN "CUBIX"* you are confronted with a screen that is either blue or red. You are instructed to push the [RESET] button on the back of the computer until the screen changes to red. I've noticed this in several programs that I've used and no one has bothered to explain the reason for this yet. Starting with the blue screen doesn't seem to make any difference. Can anybody explain this? After passing this mystical test, you are confronted with a screen that asks you to input your name and then the level of difficulty you want to try (there are 16).

Cubix is a game that is played on a three-dimensional pyramid made up of 28 individual cubes with a surface that you must jump on one at a time by manuevering your man with the right joystick. The beginning screen displays four *Cubix* characters on the right of the screen, indicating that you have four "lives." A running total of "hits" is also kept at the right top of the screen. On the left side, a pattern is drawn that duplicates the beginning pattern and color scheme for each of the cubes. Also on the left is your running point total. You start out on the top cube and you jump down, up or sideways. The surface of the cube you jump on changes from its original color to another color, pattern or state (sometimes it is just a blank). Starting with round five you must jump on the cube twice to get it to change colors. When you've changed all 28 cubes, you move on to the next round of play in which the color and pattern of the cubes is different. You also get 500 points for completing each "round" of play. I wish I could tell you how many screens or "rounds" of play there are, but to do that one would have to be good

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enough at the game to continue until the pattern you started with came up again. My children aren't that good and with me it wasn't even a contest. There may be an endless number of screens.

Just as you are having fun jumping on the pyramid squares, along come these "things" which try to kill you. The frequency of their appearance depends upon the skill level you choose. One of these "things" is called Sprink. He is a snake, but he starts out as an egg that rolls down from the top of the pyramid. When it gets to the bottom, Sprink is hatched. His single purpose in life is to land on the same square you are on. This causes instant loss of life to Cubix. Unlike real life, Cubix has four lives, so the game just continues until they're all used up. Red balls also are deadly to Cubix, as is the area surrounding the pyramid. If you are as clumsy with a joystick as I am, you will watch helplessly as your Cubix leaps off the pyramid to his death. But, like all good games, *Cubix* has some help for the skillful player. Beginning on the fifth screen, white balls will appear. If you jump on the same cube with one of these little fellas, you will get 100 points and, more importantly, all of Cubix's enemies will momentarily be frozen, giving him time to jump in peace. If you find yourself surrounded by the nasties, you may jump on one of three saucers which are placed randomly aound the pyramid. They will lift you neatly back to the beginning cube and you're off again. If you can get Sprink to chase you as you jump onto the saucer, he will continue to chase you off the side of the pyramid causing all of your enemies to disappear from the pyramid for a while. Since you get 50 points for every saucer that is left at the end of each round, you should use these only when you need them to escape.

An element of surprise, and a real neat attention holder appears beginnning at the fifth level also. Flip is a white character with red eyes who randomly jumps on cubes and changes them back to their original color or pattern. This means you have to go back and change them again. You can stop old Flip from doing his dirt and gain 300 points in the process by jumping on him.

Bonus points increase progressively as you complete each round: 1000 for round 1; 1250 for round 2; 1500 for the third and so on, until you are getting 5000 bonus points per round. You get another life when you reach a score of 10,000 points.

After Cubix has breathed his last breath, your top eight scores will be displayed. You are asked if you want to play another game. If you say yes then you are back to round 1 of play. If you say no, you are returned to the "PLEASE ENTER YOUR NAME" prompt.

The *Cubix* graphics are absolutely spectacular. There are only two other CoCo games I have seen that are in the same league with *Cubix* graphics. The ease of play is readily apparent, even to a novice. Once you jump on a saucer and take a smooth ride to the top of the pyramid, you will get an appreciation for the level of programming skill in this game. The game is well conceived in that it offers varying levels of difficulty, introduces randomness to hold attention, can be mastered to the degree that it becomes fun to try again, and does not appear to be "unfair," yet is difficult enough so that it does not become boring.

(Spectral Associates, 3416 S. 90 St., Tacoma, WA 98409, tape $24.95, disk $28.95 plus $2 S/H)

— A. Buddy Hogan

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Recall Is Amnesia Insurance

Utilities are intended to provide a useful function, but many end up collecting electronic cobwebs as they uselessly take up tape or disk storage space. They are neglected because they are too hard to use or inconvenient to load each time you need them. *Recall* is *not* that kind of utility. You may not use it often but when you do, it is a life saver.

Recall is designed to allow you to recover from several kinds of catastrophies. The catastrophy can be an act of nature which causes an I/O error as you load your favorite program. Other more common disasters come from blatant acts of dumbness like typing *NEW* or its equivalent (*POKE* 113,3:*EXEC* 40999) or a massive *DEL*ete which causes the demise of several hours of keyboarding.

Recall is a very short program that loads as BASIC. Recovery is accomplished by loading *Recall* after the error and then saving the data in memory as a normal program. You then reload this data back into the computer. In the process of recovery, an extra line of data appears as Line 0 in the BASIC listing. There is no real harm in most cases because most BASIC programs do not start with a Line 0 but this is something to look out for.

The instructions included with *Recall* are for the most part sufficient, but I would prefer a very explicit step by step procedure. Chances are you just made one costly mistake and you need the assurance of good instructions to be sure that you do not make another. Left out of the literature is the fact that this program is compatible with Disk BASIC. It can provide partial recovery from Disk I/O errors. All data read into the computer before encountering the defective sector can be recovered.

Recall comes on cassette and works with BASIC as well as Extended BASIC. Although the literature states that it loads in 16K and above memory size, it is such a short program there is no reason that it should not load in a 4K machine.

Think about the occasions where you would have given just about anything to recover all or even part of one of your valuable programs or data files. This program may pay for itself the first time you use it.

(Time Software, P.O. Box 1014, Clearfield, UT 84015, on cassette for Color or Extended Color BASIC $14.95)

—Tom Szlucha

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Take Command Of Your CoCo With *Screen Machine* Utility

Although our CoCo is a powerful machine, there is no easy way to combine graphics and text on the same screen. One of the ways that you can do this is by using BASIC's command. This works reasonably well, but it is not all that flexible, and it is a rather slow and tedious process. Someone once said "necessity is the mother of invention," which, among other things, provides the perfect lead-in to the subject of this review.

Screen Machine is a machine language utility program that will enable you to effectively combine graphics and text on the same screen, among other things. It requires at least 16K and Extended BASIC, and uses about 5K bytes of memory on a 16K or 32K machine. On a 64K machine, however, it uses only about 15 bytes of memory, by transferring all ROM to RAM.

Screen Machine includes many useful commands which provide a great deal of flexibility in formatting your screens. There are two ways that you can enter these commands. The first method is to press the [SHIFT] and [CLEAR] keys at the same time. This then displays a text screen that you can type the commands into directly. The other method is to use a *PRINT CHR$(27);* in your program, followed by one or more of the commands. Normally, this would be the method that you would use, but you can use them both at any time. In fact, you can even use the first method while your program is running.

Aside from the commands that are supported, several BASIC commands are also supported which have been modified accordingly. These inclue the *PMODE, SCREEN, COLOR, CLS* and *PRINT* commands. Of course, the other BASIC commands, *CIRCLE, DRAW, LINE*, etc., are also supported. What follows is a description of the various super screen commands.

- The help command displays a screen showing you the present status of all of the other commands.
- The density command allows you to change the number of characters displayed per line. This can be either 32, 42, 50, or 64.
- The top scroll protect command allows you to define the number of lines that should remain at the top of the screen, and not be scrolled off. What this really does is to remove these lines from the normal area where your text would be printed, so that you can use the bottom few lines of the screen for text, and have them scroll off after only printing a few lines. There is also a bottom scroll protect command that is the exact opposite of this one. In addition, either or both of these can be used at any time.
- The double-width command works only in *PMODE4* and allows you to automatically print double-width characters on the screen.
- The underline command will automatically produce underlined characters on the screen.
- The subscript and superscript commands will display your text slightly below or above the regular text. This can be useful for mathematical equations and the like, which would not look right otherwise.
- The alternate color set command allows you to use one color set for your graphics and another color set for your text. Combined with the color command (not the BASIC *COLOR* one), you can produce "artifacted" or pseudo colors on a *PMODE4* screen with no problem at all. In addition to this, BASIC's *CLS* command is enhanced to provide some rather interesting colored backgrounds.

Screen Machine also comes with two additional programs. The first of these is a nice demo, which gives you a flavor for what can be done with the program. The second is a character generator, which has a bunch of commands for creating your own customized character set. Both of these programs, however, require 32K in order to run, so if you only have 16K, you are out of luck here.

Screen Machine is probably one of the better "screen enhancement" programs available today. The documentation is well written, and does a good job of explaining the commands, although there is not much in the way of examples. It is assumed, I guess, that you will *LIST* the demo program in order to get a better understanding of the commands.

There is one item, however, that is not mentioned in the documentation. This has to do with the fact that you cannot make a backup copy of the disk that the program comes on (I don't know about the tape version, but I would assume that it applies here, too). If your disk system has never acted up and crashed one of your directories, then this should present no problem. Otherwise, you might want to find out how much it will cost you to get a replacement disk before deciding to buy this program. Personally, I would not be willing to spend money on a program that I have already paid for, but the choice is yours.

(Rainbow Connection Software, 3514 6th Place NW, Rochester, MN 55901, $29.95 tape, $32.95 disk)

— Gerry Schechter

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Relive Messy Childhood Fun — Throw *Mudpies*!

It's time to retire that old laser gun and play the old pie ir the face game — *Mudpies*! This time it's nice clean fun, i.e., no leftover pies or messy faces to clean up. *Mudpies* by MichTron (formerly Computer Shack) is a variation of the arcade game *Food Fight*. The idea of the game is to move Arnold around the circus grounds and avoid being caught by the clowns who don't particularly like being hit by a mudpie — would you?

Of course, the only way to keep from being caught is to keep throwing pies or run to the next room. But, running to the next room doesn't score points. So, for each clown you hit you get anywhere from 100-800 points. If a clown catches Arnold or he is hit by a flying object — some clowns get outright mad and throw junk at Arnold — then he has to take a trip to the first aid tent (two little guys with a stretcher run out to pick up Arnold — very cute!). Only three trips to the first aid tent are allowed before the game is over.

While you're running all over the circus grounds worrying about being caught by the clowns and earning points throwing mudpies, you also have to worry about the basic human need of food. If Arnold isn't fed periodically, he loses energy and slows down to about half speed. Feeding Arnold is no problem since the food he thrives on is easily found at a circus — hot dogs, fries and shakes. But, be careful not to overfeed him, either; he slows down to half speed when he's stuffed.

To add to the challenge of the game, there is a special mudslinger round and a challenge level. For the mudslinger round, which appears after every 10,000 points are obtained, Arnold gets a "pyramid"of mudpies which he can throw at clowns with little or no retaliation — unless he gets too close to a clown. Thirty seconds are alloted for this round. In the challenge level, Arnold must run through a room with no pies or food but loads of clowns. If he makes it, he is rewarded with 2,000 points.

Now that you have the picture, let's take a closer look at the details of the game. Both tape and disk versions are available and 32K is required. The disk version was reviewed so a simple *RUN "MUDPIES* loads and executes this machine language game. The game is copy protected and does our disk drive know it! The drive did so much chattering, chugging and grinding that we thought the whole thing would fall apart. Now we fully support software protection; but, what the disk drive has to go through to load the game seems quite excessive.

When the game is finally loaded, the screen informs you to adjust the color by pressing [ENTER] if the screen is blue or [RESET] if it is red. You may have to push [RESET] several times as we did to change the red to blue. Pressing the [SPACEBAR] will allow you to play the game on a light background; otherwise, a black background is used. We preferred the black background. The title screen follows next and you have a choice to press the fire button to play the game or to press [H] to list the high scores.

As the game begins, there is a short rendition by the circus organ, which, by the way, is very well done; however, if you get tired of the music you can press [CLEAR] to stop it. Using the joystick you maneuver Arnold around the circus. As Arnold runs over a mudpie or food he picks it up. Pressing the fire button causes Arnold to throw the mudpie in the direction of Arnold's movement. An indicator on the right side of the screen shows the status of Arnold's hunger. According to the directions, a value below 1 (100) or above 3 (300) on the food scale will result in half speed for Arnold.

Overall, we found the game to be well done with very good graphics and sound effects. The built-in pause function and control of the music are obvious plus factors. However, for an experienced joystick jockey, the game was not that challenging. We did find a problem with the food indicator. It does not indicate values above three as the instructions claim, so you don't know when Arnold is overfed until it's too late. In fact, we had several situations where Arnold slowed to half speed and the food indicator still read two —an obvious bug.

For those who enjoy "maneuver and shoot" games, *Mudpies* is an excellent game; for those who have been playing similar type games which depend solely on joystick dexterity, we would rate *Mudpies* at about average to good.

(MichTron, 1691 Eason, Pontiac, MI 48054, 32K tape, $27.95; disk, $29.95)

— Don, Pat, and Chris Dollberg

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Software Review

*Q*Man* — A Bouncing, Challenging Clone

Every once in a while I decide to go down to the local arcade and "check out" the newest games that are out. Every time I take this little journey, I always swear to limit myself to one dollar worth of games. (Promises are meant to be broken, or so the saying goes.) The last game that made me break this promise goes by the name of "Q*bert."

The game itself really sneaks up on you. The object of the game is to touch all of the cubes on a three dimensional grid with your funny-shaped bouncer (alias Q*bert). Although this may sound easy enough, there are some obstacles (aren't there always?). There are two primary enemies: the bouncing snake and the falling balls. Also added to make it interesting are a teleportation disc and a little guy that runs around and ruins all your work. (Why does it seem this game parallels life?)

Genesis Software has just introduced a version of this (very) addictive game. Genesis calls their version *Q*Man* and has done a pretty good job in converting this arcade game for the CoCo.

The game starts out with a title screen that could be a little less lengthy. The screen shows our hero (*Q*Man*) insulting the "monsters" of this game.

After the title page has run its course, the game begins. The game play is amazingly like the original. The *Q*Man* bounces precisely, and is dutifully chased by the snake and the ball. The rotating discs are even put in the same place as in the game's older (arcade) brother.

The graphics, however, need some work. Although I cannot say they are bad, I cannot say they are good. The graphics of the game do not seem to have been given too much detail. The game's creatures are a little hard to distinguish. (Is that really a snake?)

The sound also is disappointing. In the arcade version, when the "Q*bert" dies, he grumbles a little obscenity in some language apparently known only to Q*berts (Q*bertese?).

The documentation, however, is *superb*, especially for an arcade game. The game's instructions include a four-page instruction booklet. The game is very well explained, and I wish all software publishers would take as much pride in their documentation as Genesis did.

*Q*Man's* playability is good and very challenging. Genesis Software is offering a $25 gift certificate to the first three players who reach level nine. At this point, this seems a nearly impossible task to complete (I have made it to level three).

If the game's graphics were improved, and a little polish was added onto the game to make it a little more "gee-whiz," the playability would carry it into the ranks of the classics.

(Genesis Software, P.O. Box 936, Manchester, MO 63011, $26.95)

— Eric Oberle

Book Review

'Your Color Computer' — A Perfect Introduction To The CoCo

Although I know a number of people who are acknowledged computer experts, I also know some folks who wouldn't know a microprocessor if it bit them on the nose. I have been asked many "dumb" questions about computers from time to time, and although I enjoy answering them, sometimes I wish they could get a good book on the subject that would explain everything they wanted to know. Unfortunately, every beginners' computer book I've seen is either boring, erroneous or out of date. Until now, that is. I just got a review copy of "Your Color Computer," by Doug Mosher.

This book is not out of date; in fact, it is copyrighted 1984, even though I received my copy in November 1983! It is recent enough to mention the TRS-80 Model 4, and an appendix tells about the CoCo 2 and the 64K CoCo. The two things that are dated are the frequent mention of the TDP System 100 (which was dropped a few months ago), and the great emphasis on the Plug 'N Power controller (which Radio Shack quietly discontinued a while back). This should not confuse anyone though, because he does outline these in the appendix.

I was shocked to find not a single factual error in the entire book! Everything Mosher says is true as far as I can tell. His advice about connecting the CoCo to a motel TV (which could bring the house detective and the local cops rushing to your door) is the only thing I can fault him for.

As for completeness, the 342-page book tells just about everything a new CoCo user would need to know, from hooking up the computer all the way to speed-up *POKEs*, with information on programming, hardware construction, computer clubs, and books and magazines (including three paragraphs about *the Rainbow*) in between. Anybody who reads this book (and the "Color BASIC" and "Extended Color BASIC" manuals) will come away knowing everything one needs to know to make effective use of the CoCo. There are also five effective programs listed; a calculator, a clock/calendar program, a driver for the Plug 'N Power controller, a telephone dialer for the Hayes Smartmodem and something called "Color Crazyquilt" that creates random patterns on the low-resolution graphics screen.

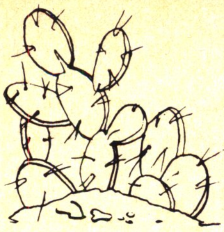
Boring? Hardly. Doug Mosher's writing style is clear, concise and personal. He doesn't get bogged down in technical phrases, but he doesn't oversimplify matters, either.

The only thing I can fault the book for (and it isn't the author's fault) is that the color photos of various displays were placed on 16 pages in the center of the book (in the section about magazines), rather than being put in the sections referring to them. This old-fashioned approach (which was also used in the "Extended Color BASIC" manual) makes things easier for the printer and harder for the reader.

"Your Color Computer" is the best beginning computer book that I have ever seen. It should be the perfect introduction to the CoCo for anyone who has one or is thinking of buying one. And if you are trying to decide which home computer to buy, this book is one of the best reasons to get a Color Computer.

(SYBEX, 2344 Sixth Street, Berkeley, CA 94710, $16.95)

— Ed Ellers



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Ockywoky

We are proud to announce that we are now the exclusive publishers of this great game from Shooting Star Software. Lovers of SPY THRILLERS take note. In Ockywoky the object is to find out the name of the double agent (code named Ockywoky) who operates on behalf of the evil Dr. Glimm. Ockywoky is to be found in one of 16 bureaus worldwide, and the field of suspects has been narrowed to 32. You can discover the identity by interviewing informants or by finding Dr. Glimm's headquarters and the combination to his safe. While you have a private jet at your disposal, your money and time are both limited. There are four difficulty levels, and the game is different each time you play. Average playing time is 45 minutes. This game uses a combination of text and hi-resolution graphics, and naturally it requires 32K of memory with Extended BASIC. If you've been disappointed by other so called mystery games, this is for you. Sherlock Holmes would have been proud of this one! **Tape (disk compatable) - $24.95; Disk - $29.95**

Baseball

Most sports computer games require no more knowledge of sports than Pac-man, but this one is different. This is a strategy version of the game, and you can play against another player or the computer. You decide on the pitch, whether to swing, steal, etc. This game plays just like the real thing, and a good knowledge of baseball will be needed if you plan to beat the computer, so if you're tired of arcade games and want a more mental challenge, this baseball is for you. Needs 32K Extended BASIC **Tape - $24.95; Disk - $29.95**

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Super Scroll

This brand new utility from the author of Colorkit gives 64K owners all the most wanted features. With this program in the computer, everything that scrolls off the top of the screen is stored in the upper (unused) 32K of RAM. When you want to look at it again, you can scroll up and down through this buffer using your joystick. For example, if you list a long BASIC program, most of it will scroll right off the screen, and now you can browse up and down through your longest listing. In addition, you will have the advantage of a FULL SCREEN EDITOR, a GLOBAL SEARCH, and even a definable key. If you program, you will save hours of debugging time, so quit letting your valuable text scroll into oblivion. Call it back with SUPER SCROLL. Works on 64K RAM tape or disk systems. **$24.95**

Modem Master

This program is designed for use with the Hayes Smartmodem or Novation Smartcat, and for you owners of these advanced modems the Modem Master will finally let you use all of those neat features you see described in the manual. Auto-dial, storing your list of bulletin board numbers for automatic calling, and a lot more. If you spent the money for a top modem, it's time you got to use all the top features. Modem Master is compatible with most all popular terminal programs, and requires a disk drive and at least 16K RAM. **$24.95**

Light Runner

An extremely challenging ARCADE ACTION game! You control the direction of the moving dot that draws a line of light, while the computer controls the direction of up to three others. If you run into your own light line, any of the computer's lines, or the edge of the screen, it's death, and you can't stop to think. Your fire button will speed you up, but you must keep running and running, with instant oblivion just a slight miscalculation away. Yes, this game requires superb reflexes and lightning responses, but in addition you will have to be planning your strategy — while you dodge destruction. Are you up to the challenge of the Light Runner? 100% machine language and all Hi-Resolution graphics. Don't miss it! **Tape - $24.95; Disk - $29.95**

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Beam On Board A Starship With *Starblazer*

Picture this! You are Captain Buck Rogers commanding the Battlestar Galactica with the crew of the USS Enterprise serving under you. Sound strange? Well, you won't actually find any of this mentioned in the rule book of Ark Royal's new simulation game *Starblazer*. But if you, like me, are an avid science fiction admirer, you can easily read between the lines and find the many similarities.

This new "Trek"-style game from Ark Royal is written in Extended BASIC with machine language enhancements and requires 32K of memory. It comes on cassette or disk and includes a single sheet of instructions. This instruction sheet is folded into quarters with relatively small print and therefore equates to an eight-page rule book. These instructions are, by the way, very complete and well done, including all the commands necessary as well as a brief story line to get you in the mood.

For those of you who may have just moved here from Tibet or some such place and are still unfamiliar with "Trek" simulations, I'll give you a brief description. *Starblazer* is a tactical level (ship-to-ship) war game simulation. You, the player, are provided with a screen display containing all the necessary information to effectively command your Starship, the USS Wasp. This includes a graphically depicted viewport (text screen graphics), a status console providing power level readings on all equipment as well as the current status of your offensive/defensive armament, and a message display screen where you can issue commands and receive messages from your crew (I'd swear the chief engineer has a Scottish accent). With this constantly updated information you make the decisions and give the commands that control the destiny of the USS Wasp and her crew. Believe me, this is no easy task, and if your previous command experience is limited to "space invader" type arcade games, you could be in for a great deal of trouble. I don't want to scare any would-be commanders away but, all in all, this is a very complex, real-time, simulation that requires quick thinking and the ability to juggle dozens of inputs at the same time.

Starblazer differs from many other games in its story line and complexity. The USS Wasp you command is the only surviving Battlestar (oops, excuse me! Starship) and is relatively obsolete when compared to the current level of technology. In other words, the Wasp doesn't resemble the Galactica or the Enterprise as much as it does a '49 Hudson with bad plugs. Still, she is a proud ship and has a lot of fight left in her, given the right commander at the helm. If you think you can handle it, I recommend you beam on board and enter the fascinating realm of war game simulations.

(Ark Royal Games, P.O. Box 14806, Jacksonville FL 32238, tape $24.95, disk $27.95)

— Ken Boyle

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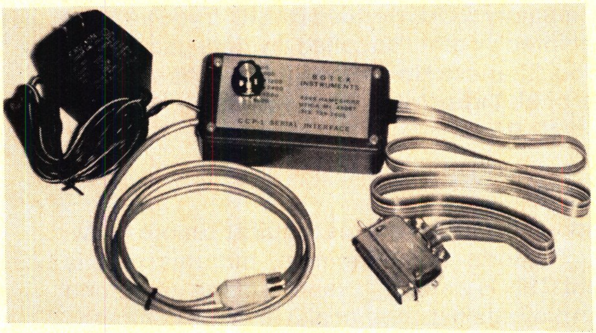

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Practice Makes Perfect With *Skip Counting*

Skip Counting is a mathematics program from B5 Software. It is designed for children and allows them to practice a combination of addition/subtraction and multiplication tables. It requires 16K Extended BASIC.

Before *CLOADing* and *RUNning* the program, the user types *NEW:PCLEAR4:CLEAR200:PMODE4,1*. A screen appears which asks the child to choose what number he wishes to count by. The choices are one through 10, 15, 20, 25, 50, 100, 1000. After the child selects the number, he must input the beginning number and the ending number. These numbers must be between zero and 9,999,999, and the use of commas is optional. If the child wants to count backwards by a certain number, he must make the beginning number larger than the ending number. An opportunity to make a change is given, then a new screen appears. The top of the screen shows the numbers that have been selected.

The child starts inputting numbers, starting with the beginning number. If a mistake is made, the user can use the back arrow to clear the screen and try again. The child is allowed two chances to input the correct number, after which the correct answer appears on the bottom of the screen. The sequence ends when the child has reached the ending number. If the user sets parameters that take too long to complete, [SHIFT][↑] will exit the lesson during a counting sequence and return to the main menu.

As the child enters numbers, the numbers are listed in columns. The cursor gives the child a hint about how many digits are in the next number. When the column is more than ten numbers long, the column, not the screen, scrolls up. Unfortunately, this scrolling slows up the program and is a little confusing at first. At the end of the sequence, the song "This Old Man" plays and a cute little dog is given a bone. Hitting any key allows the child to begin again with another number sequence.

The documentation is well-written and easy to follow. It offers many suggestions for the use of this program. For example, young children may count from one to 100 by ones whereas older children could count from 9,999 by nines, thereby giving them practice in mental addition (or subtraction). Multiplication tables can be practiced by counting by any given factor.

Skip Counting is a very simple program to use and a young child would only need help in loading it. It is very low-key and serves the purpose for which it is intended. It can help a child develop "number sense" and see number patterns that develop. It provides good practice and could easily be used at home or in school with virtually no adult supervision.

(B5 Software, 1024 Bainbridge Pl., Columbus, OH 43228, tape $16.95)

— Stephanie Snyder

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Three Game Pack #2
A Good Bible Drill

I was telling our pastor about Quality Christian Software's *Three Game Pack #2* when he got the idea it would be great for me to bring the CoCo to the youth group again in the very near future.

I would venture to say that when I do bring CoCo to church, the pastor will be prominent among those who play the game.

Quality Christian Software is providing a much-needed service, not only from the standpoint of good Bible drills and learning devices, but because there are many people who have strong feelings against some "games" and QCS is providing an alternative.

There was one mechanical difficulty with these programs. There was a tape I/O problem on the first side and the *Who?* game would not load. The other side was fine and I was able to play the games to my heart's content.

The programs transferred to disk without a problem, and they work just as well in that media as they do from tape.

The documentation is one printed sheet with a cover and has important information about the *PCLEAR* needed for 16K owners. There is a brief description of each game in the documentation which explains the object of the games and how to play.

Sword Drill is pretty much the reverse of what you may be used to. The scripture quotation is presented and you are asked to pick one of five choices of chapter and verse.

When the game is *CLOADed* and *RUN*, you first see the billboard and then get a couple of beeps from the beeper. You are given the choice of how many questions you want to answer and how much time you want for each response.

You can introduce an element of competition if you wish by pitting your time and score against the time and score of an opponent. Whatever you do, you can get some very valuable practice for your Bible quiz team or just for your own edification.

Who Did That? is a really super game which is formatted pretty much the same as *Sword Drill* and is just as much fun. It loads the same way except you are greeted in this case with a lilting melody when you *RUN* the program and you have a chance to enter your name in the contest.

Who Did That? also scores on elapsed time and best score and keeps a record of the best time and score for each session.

The documentation says that *Bible Places Word Scramble* is "randomly picked to drive you bananas." Truer words were never spoken.

Here is a game of knowledge, but also skill. You really have to look hard to get Ethiopia out of apthioei. It is a real challenge (I'm gonna load that one up for the pastor.)

As in the other games, you may choose the number of questions you wish to answer and the time in which to answer them and there the likeness ends. In *BPWS* you have the word flashed on the screen and you get one kind of a "beep-boop." If you run out of time, it sounds as though they are coming for you with one of those European police cars.

These are fine, uplifting programs which will be a welcome addition to the collections of many folks who have been looking for Christian software.

I am really looking forward to the next time I take the CoCo to our youth meeting. I am sure the young (and the wish-they-were-young) will really enjoy these three games.

(Quality Christian Software [QCS], P.O. Box 1899, Duncan, OK 73533, 16K ECB tape, $10.99)

— Howard Lee Ball

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RAINBOW CERTIFICATION SEAL

Helpful Hint . . .

Printer Pokes

Here is a short BASIC program to calculate the *POKE* values for any speed printer. The results given are not exact, so you may need to add or subtract 1 from the value displayed for address 150. Some CoCos cannot operate at the highest speeds.

```
5 'COCO RS-232 POKE CALCULATOR
10 INPUT "BAUD";BAUD
20 P=INT(55600/BAUD-16/3+.5)
30 P1=INT(P/256):P2=P-256*P1
40 PRINT"POKE 149,"P1
50 PRINT"POKE 150,"P2
60 GOTO10
```

Kevin W. Davidson
Easley, SC

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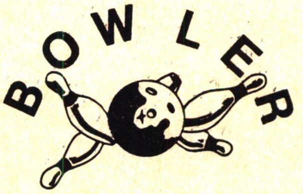

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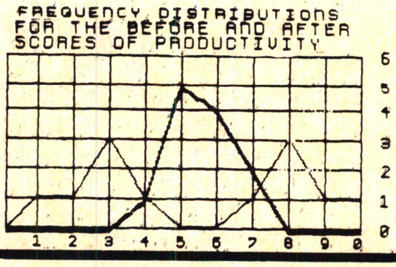

Second program provides Analysis of Variance between treatment and control groups. Each step in calculation is displayed (raw scores, delta scores, deltas squared, grand square, SSB, SSW and "F" number). Program then tells you if variance is significant and, if so, which group showed improvement. Printer Output Option. 32KEXT $34.95

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The Answer: A Most Unusual Device

The Color Computer is now fairly mature as computers go; lots of good software and peripherals are available. There are devices that let you plug in a disk controller and a ROM cartridge, power indicator lights, parallel printer interfaces, parallel I/O port interfaces, smart terminal programs on tape, disk and cartridge and machine language monitors also in all three formats. But how often do you see all of these combined into one product? *The Answer* is just such an item.

The Answer is about the same size as Radio Shack's disk controller and, in fact, is built into a Tandy controller case. Two toggle switches and a light are mounted at one end along with two edge connectors (one at the end, one pointing toward the front of the computer). There are two small sockets (for the printer and parallel I/O ports) visible through a hole in the top of the case. Let's get this out of the way quickly: *The Answer* is ugly. Those who insist on having a computer setup that is neat and tidy enough to win the coveted Golden Hammer Award will not like it. The rest of you should read on, as this ugly duckling can stand on its own without having to turn into a beautiful white swan.

Cartridge Port Splitter

The Answer lets you plug in a disk controller and a ROM cartridge at the same time. You can switch from the cartridge program to Disk BASIC without having to unplug anything. You can also shut off the auto-start feature of ROM packs to let you modify a ROM program (say, to allow disk I/O) easily and safely.

In the unit I tested, the edge connector for the disk controller had problems holding the controller in place; it would droop and cause a bad connection. I solved this problem by propping up the controller with a paperback book (I recommend *My Years With General Motors*, by Alfred P. Sloan). Seriously, once the controller is held up, the connection is good. A problem will arise if you ever plug in a cartridge that uses more than 8K of ROM, as *The Answer* has its own ROM located just above the normal 8K cartridge ROM space. (I don't think there are any cartridges that big just yet, though.)

Pilot Light

There is a red LED power-on indicator, which works fine with older Color Computers, but it doesn't work with the new Color Computer 2 because the -12V supply that it uses is just not present in the CoCo 2.

Parallel Printer Interface

The Answer uses a true parallel interface instead of a serial-to-parallel converter. This technique provides much faster printing; for once, the CoCo is faster than the printer. The only drawback is that a driver program is needed to direct the CoCo's printer output to the parallel port instead of the serial I/O port. *The Answer* has a driver built into its

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ROM, so the only special command needed is a simple *EXEC 65152*.

To make a parallel printer work with machine language programs, you need to patch them to call *The Answer's* driver (located at &HFECC) instead of the driver in the Color BASIC ROM (at A2BF). If you are familiar with 6809 machine code and know where to find the calls in the program you need to modify, you can do this easily. The manual gives detailed instructions for patching Cognitec's *Telewriter-64* to work with the parallel port.

Parallel I/O Port

The Answer has a second parallel I/O port available, which is mainly intended for the hardware hacker who wants to interface special-purpose equipment to the CoCo. (It could be quite useful for data logging, for example.) The port also has the NMI (non-maskable interrupt) line and the audio input (to feed an external audio signal, like from a speech synthesizer, into the TV along with the CoCo's own sound and picture) available, as well as a +12V source (except on the CoCo 2, which doesn't have +12V). I did not test this feature because I don't have any equipment that would use it.

Machine Language Monitor

The Answer has a fairly complete monitor in ROM which has the advantage of being available along with a ROM cartridge. Eighteen commands are available, including cassette (but not disk) I/O. The monitor is useful with a device like this because of the need to patch machine language programs to use the parallel printer port.

Smart Terminal Program

The terminal program, *COCOTERM*, is very complete, with download buffers, cassette and disk I/O and a 51-by-24 screen. It is the only CoCo terminal program that I've seen (aside from Radio Shack's new Deluxe RS-232 Pak) that allows for on-line printing, thanks to *The Answer's* parallel port. It has just about everything (aside from auto log-on) that a terminal would need, but is not without its quirks. One strange thing is that you send a control character by pressing the [down-arrow] key, *releasing it* and *then pressing* the desired letter key. Another problem is that the default configuration (two stop bits at 300 Baud) is not used by any system that I've ever heard of. Aside from that, *COCOTERM* works very well indeed and is a nice bonus.

If you need some or all of these features, *The Answer* may well be *your answer*.

(Midwest CoCo Systems, 1800 W. 91st Place, Kansas City, MO 64114, $179.95)

— Ed Ellers

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More Business Means Business

More Business is a complete small business accounting system for the Color Computer from Moreton Bay Software. For those critics that often wonder where the "serious" software is for the CoCo, *More Business* does a great deal to help relieve that situation. The system requires only one disk drive, a printer and a 32K computer. The purchaser is allowed to make backups of the master disk so that all information can be saved on the same disk that holds the programs.

The entire program is based upon a database management system called *Files*. The *Files* program is configured in six different applications: accounts payable balances, accounts payable invoices, accounts receivable balance, accounts receivable invoices, chart of accounts and journal. The system is menu-driven and uses a number of prompts in each section to achieve the results needed. The system supports data from transactions that are invoiced or not recorded by invoice and outputs standard accounting summaries such as profit and loss statements, balance sheets, aging lists and statements to customers. The system will also print mailing labels for accounts receivable and accounts payable. As one can see, this is a complete system that doesn't need any add-on programs or special operating systems to do most of the accounting needs of a small business. Up to 400 accounts payable and receivable are supported.

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The system comes with about 150 pages of documentation that is divided into four parts. Part one is a general overview of how the program works. Part two is a well-written tutorial on how to use the program. This 57-page section is for users who are not familiar with either accounting software or accounting (such as this reviewer). It follows the mythical business of "Joe Klutz Computers" as learners are instructed to input transactions from day to day and month to month of a small computer firm. This is not a tutorial that tells you every keystroke to take and how to answer every menu prompt. You have to *think* about this one as you learn about what class of account gets a credit and what class gets a debit for each transaction. If you get really confused, the answers can be found in Appendix 1 in the form of the many printouts that are generated by the tutorial.

Part three of the documentation is a procedures section in outline form. Intended for the experienced users, this section includes instructions for start up, day-to-day operation, month end, year end, correcting errors and what to do if the program crashes.

Part four includes a complete glossary of terms, explanation of screen prompts and quick reference to the entire program. I found myself referring to this section a great number of times and I was very satisfied with the answers I found there.

A printer is a very important part of this program for all the output provided. Although the program is initially set up for the Radio Shack DMP 100, other printers may be used by inputting the correct printer codes during initialization. Underline and double-width are the two print changes needed to operate the program.

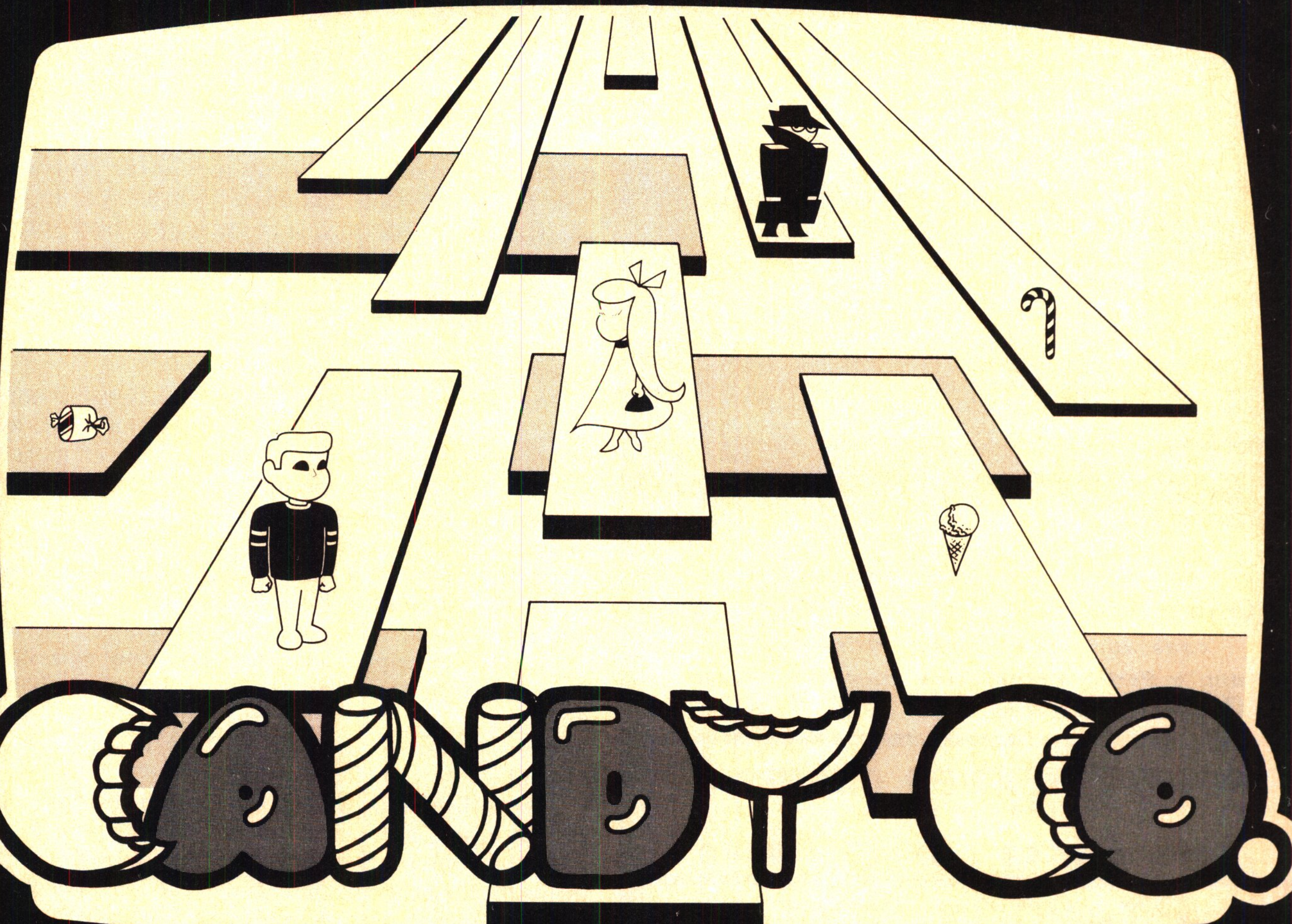
I did have a few minor problems with *More Business*. A few times during my run through with the tutorial, some terms were mentioned that confused me. A quick journey to the glossary solved most of these questions. The manual had a few typos and line-skips that will probably be fixed by the time you read this — these also were confusing. Finally, for some reason the first line of the printouts for audit trails did not line up correctly on my Epson MX-80. I have a feeling this may be a program bug and that it will be solved in future upgrades. Upgrades, by the way, are provided free of cost to all registered owners. The manual mentions that the producers are interested in any and all problems so that they may be fixed for all users concerned.

I have never taken an accounting class, so I can't tell you how close this program follows conventional accounting procedures. I would guess from reading the documentation that the correlation could be close. I do know, as a newcomer to accounting, that this program can be mastered (with a bit of study) by a non-accounting student and that it makes a dandy way to use the Color Computer for a serious small business application. I think this system is a winner. If you have a small business that needs to computerize its accounting, consider *More Business*.

(Moreton Bay Software, 316 Castillo St., Santa Barbara, CA 93101, disk $99.95 32K)

— Brian James

Setting The Standards



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Programmer's Worksheet — A Good Documentation Header For Your Programs

Documentation is an important part of programming, often overlooked by beginners. Producing good documentation can be the most difficult part of the programmer's task. Program documentation comes in many forms — flow charts, user instructions, subroutine specifications, structure charts — an endless variety of program descriptions, all slanted for different audiences and needs. The programmer needs to be aware of the function of each module in his program, what variables are used, how subroutines are called, unusual conditions, etc.

Programs prepared in a professional setting, normally contain an extensive "header" section, which describes all the important aspects of the module. However, most BASIC programs for personal computers can't contain such extensive in-line documentation because of memory size restrictions.

Tom Mardis, of CoCoDATA Enterprises, has prepared a simple "Programmer's Worksheet" which serves as the documentation header for your BASIC programs. The sheet is designed to be copied and used repeatedly as a standard form. The form comes printed on card stock, with instructions for its use on the reverse side. Also included is a reduced version of a filled-in worksheet. This serves as an example of how the form can be used.

The worksheet has several sections which allow organizing the program information in a logical order. First is a general section for the name, purpose, and system requirements for the program. Next comes the exact file specification, author and date. A small area is set aside for miscellaneous notes.

The bottom two-thirds of the sheet is devoted to variable descriptions and subroutine specifications. The variables section is divided into numeric variables and string variables. In each section, there are 16 lines for variable names and short descriptions of the purpose for each variable.

The subroutine description has seven lines for writing the line number of the subroutine and a brief description. Normally you should also specify the input and output variables to each subroutine, as well as any variables which are used locally. This is particularly important in BASIC, where each subroutine can share variable names with the rest of the program.

I used the Programmer's Worksheet to document several of my short programs. I found the exercise helped me review the function of each variable and subroutine in the program. I am sure the information will be invaluable when I modify or rewrite the program in the future.

If you haven't developed good documentation habits yet, you should give the Programmer's Worksheet a try. I'm sure you will be pleased with the organization it provides.

(CoCoDATA Enterprises, 8417 Bermuda Dunes, Orlando, FL 32819, $1.50 ppd [$1 with SASE])

— Stuart Hawkinson

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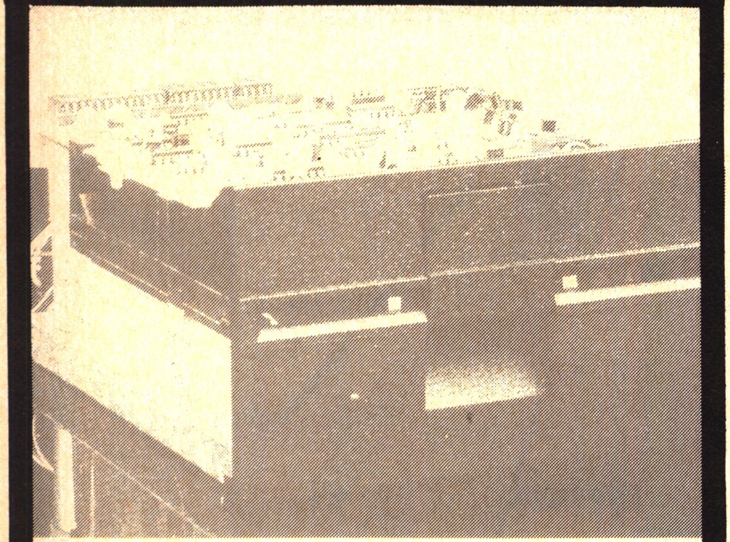

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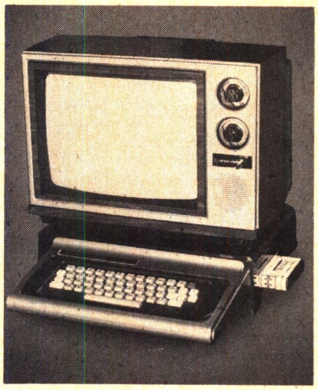

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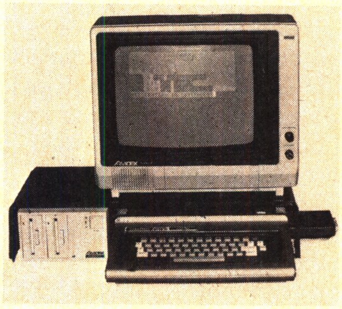

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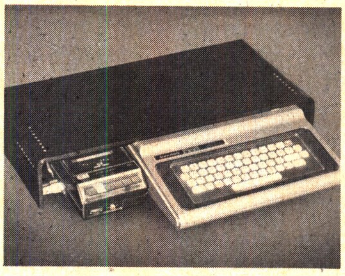

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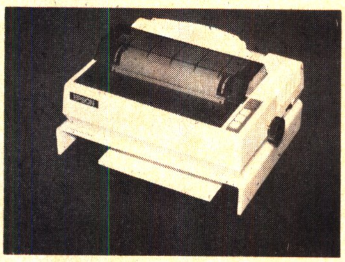

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CA-1 $24.45	Cable to connect disk to controller. Call or describe

Jet-I A Direct Hit With Young Children

Any of you with children who have been afflicted with the Star Wars craze will understand why your child's collection of memorabilia from those great movies is not complete until it also includes the computer games, too.

For some reason, CoCo creators have been slow in warming to what is obviously a great market for games with identifiable Star Wars characters. I know we have a lot of space games available but Darth Vader, Luke Skywalker, Yoda, etc., are in a class by themselves.

Recognizing the potential of these games that children can identify with, and armed with the talent that imagination requires, the folks at ThunderVision Software have given us one of the more exciting segments of one of the episodes, which they have labeled *Return of the Jet-I.*

You are thrown in the midst of the unforgettable drama of the rain forest as Luke Skywalker — aboard one of those incredible speedcycles, being pursued by those persistent Imperial Stormtroopers.

A speedcycle, in case you didn't see the movie, whizzes along in mid-air at unbelievable speeds about three or four feet above the ground. When you add a forest with more trees than any in the Belgian Congo, you have created some hair-raising adventure.

You must avoid slamming into the trees, of course, and at the same time attempt to finish off the Stormtroopers. When enemy riders appear, you may destroy them by either bumping them into trees or by shooting them with your laser. Hitting a rider from a great distance is worth extra points. You also can pick up 1,000 bonus points by rescuing the little bears you find along the way.

When you have made it through the woods, you must successfully penetrate the Imperial Power Station and destroy the deadly power beam. You first must maneuver your way through the narrow openings in the walls that surround the station.

A direct hit will destroy the power station and add to your shield strength, which is displayed at the top of the screen. Then it's back to the forest for more thrills.

There's a nice title screen that gives the scores for two players, along with the high score achieved.

Each player has the option of selecting a skill level from one to 15. The game was designed to cover a wide variety of players, including young children. Experienced arcade buffs probably will want to start at level nine or 10.

The game is written in machine language, allowing for the rapid action that is required to simulate the situation from the movie.

Overall, the game is really of the cute variety, appealing strongly to young children — if the reaction in our family is any barometer. The real value is the message that it sends to other programmers: CoCo owners want Star Wars games. Why should Atari or Coleco dominate the market?

(ThunderVision, P.O. Box 3241, Grand Junction, CO 81502, tape $24.95)

— Charles Springer

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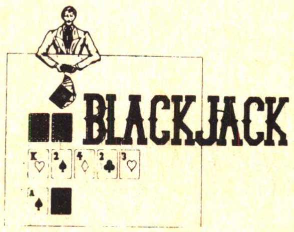

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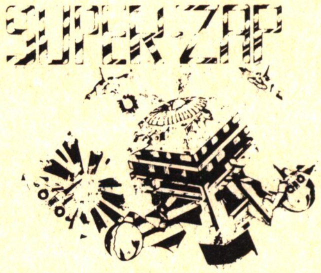

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Understand Old Errors With *NEWERROR*

A twenty-page manual that is referred to constantly is probably more valuable than a 20-volume set of books that gathers dust on the shelf. Utility programs are a great deal like technical manuals or reference books in that respect. The need and worth of such a work can only be determined by the person using it.

NEWERROR by Dataman is a handy little utility if you write or alter programs in BASIC for your own needs or for sale, but not so often you remember all the error codes you may encounter (who does?) If you find yourself thumbing to the back of your CoCo user's manual to find out what "*ID*" or "*RG*" mean more often than you would like, read on —this may be your kind of utility.

NEWERROR comes complete on cassette with a 14-page user's manual. The documentation is both good and readable. There isn't much fluff to either the program or the manual (which I like), so most of what you get is pretty much to the point. Included in the manual are how to load the program onto disk, as well as some good user hints and examples.

The program itself is machine language. It loads in about 13 seconds from cassette and clears its own space in memory. The manual states the program is usable with any Color Computer with a minimum of 16K of memory, including Color BASIC, Extended Color BASIC, and Disk Extended Color BASIC. I found this to be true.

The manual also states the program will work with many other utility programs as long as you load *NEWERROR* first. I also found this to be generally true, however a program like *Telewriter-64* which uses all of memory will blow it right out. Other utilities and programs, both BASIC and M/L that I loaded on top seemed to be perfectly happy with *NEWERROR*, and the BASIC ones all used its reports as specified.

Just what exactly does *NEWERROR* do? It alerts you on error (any error generated in BASIC) with two bell tones that you have sinned. Then, instead of giving you a cryptic two letter error code, gives you a plain English report. For instance instead of "SN" you would get "SYNTAX ERROR IN X," where X is the statement number.

The line with the error is then displayed, with a flashing cursor at the last valid character interpreted. On extended machines you can then enter the EDIT MODE by pressing "E" and correct your bug, or you can exit by pressing any other key. If you do not have Extended BASIC or Disk Extended BASIC pressing "E" will also cause you to exit. Either way, you know where and what the bug is, so the fix is much easier.

You can also embed a short *ON ERROR GOTO* command in your BASIC program to facilitate debugging while the program creation/rewrite is in progress. Further, you may use the embedded routine in programs you plan to market without having to license it. That's a nice whistle to go with the two bells.

The program loaded the first time, and also on subsequent loadings at a reasonable range of volume settings. I did find one minor typo in the program which Geoff Wells at Dataman advised me would be remedied immediately. Other than that the program performed as expected. This indicates it was created and packaged with care.

The final line. Would I buy *NEWERROR*? Personally, perhaps I would, because I was sufficiently impressed. If you are considering marketing some programs, you may want to call Geoff Wells at Dataman and ask for his catalog and dealer schedule.

(The Dataman, P.O. Box 431, Station B, Hamilton, Ontario L8L 7W2, $16.95 U.S., $19.95 Canadian)

— Gary Smith

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Interactive-A is an assembler... but we must WARN you. It is NOT an ordinary assembler, there are dozens of ordinary assemblers available for the 6809, and if you don't want to change the way you program, buy one of them... ***However, if you're tired of performing surgery with a butterknife... then read on...***

We took a look at the programming process and decided it was inefficient to wait for a program to re-assemble after every change, and that it was even more inefficient to patch a program, only to find out 15 minutes later that the patch was wrong.

IA™ is a very fast one pass assembler, and it ONLY reassembles and auto links the subroutine or variable that has just been changed.

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- ★ trap on variable reference

AS **IAD™** has access to the assemblers tables, variables may be referenced symbolically. ***You should see IAD in single step mode. It looks like a logic analyzer!***

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Decision Maker is an unusual program from Armadillo Software. Furnished on tape, it requires Extended BASIC and 32K of RAM. It is a "tool" that leads the user to a reasonable course of action for most any problem. It does this by taking the user, step by step, through a logical decision-making process.

1) The user identifies the decision to be made (the problem).
2) The user identifies any number of alternative solutions.
3) The user identifies any factors to be considered in reaching a decision.
4) The user assigns relative weights to each factor identified in the previous step (only if some factors are more important than others).
5) The user evaluates (on a scale of -5 to +5) each factor for each alternative solution.
6) Upon completing step 5, the computer calculates the relative merit of each alternative solution (using the data input in steps 3, 4, and 5) and identifies the solution with the greatest merit. It also displays the calculated merit of each proposed solution. (If two solutions are of nearly equal merit, the instructions suggest that it may be useful to rerun the program after reconsidering the chosen factors, their relative weights, and their assigned values.)

The program is menu-driven and prompts the user for each input. There are several opportunities to correct or modify previously entered data.

The comprehensive 16-page instruction book details each of the twelve screens (menus and data) in the program using, as an example, the problem of choosing an automobile. It also cautions the user:

> *Decision Maker* is not a substitute for human thinking and evaluation. It is a tool to aid in sorting out and evaluating what you already know. It is a tool for presenting the facts in different ways than you might otherwise look at them. It will not tell you what is right or wrong. Only you can decide for yourself what is right or wrong.

This program, although it does nothing that a user could not do without a computer, helps (forces) the user to exactly identify the problem, its alternative solutions, and the pros and cons of each. And by repeating the program, the problem can often be more precisely defined and evaluated.

My only criticism of *Decision Maker* is that it does not allow the user to do a partial return (to screens 7, 8, or 9) to modify factors to be considered, their relative weights or values, once the program selects the "best" solution. I would like to manipulate these parameters to note their effects on the decision. Using the present version of *Decision Maker*, I must rerun the program each time, re-entering the decision to be made, the alternatives, and the factors to be considered — an effort that could require significant time when evaluating a complicated problem.

(Armadillo International Software, P.O. Box 7661, Austin, TX 78712, cassette $24.95 plus $2.50 S/H)

— Jerry Oefelein

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Ockywoky — Get Smart And Come In Out Of The Cold

The place: New York. Your mission, since you chose to accept it, is to identify the devious *Ockywoky*, who is wreaking havoc as a double agent among the forces of motherhood and apple pie. You can do so either by contacting informants in cities around the world for clues or by locating the Headquarters of Dr. Glimm, evil mastermind, and then obtaining the three-digit combination to his vault. Oh yes, you've got $3500 and 10 days.

You race to the data banks of your trusty CoCo. Great! The search has been narrowed to only 16 cities, each with an agent and bureau chief. Might as well start with an informant here before running halfway 'round the globe. You shell out $250 of your funds, eagerly anticipating the clue. Only problem is, the informant's got your money but doesn't show! You try another contact . . . and are promptly kidnapped by one of Dr. Glimm's agents. When you finally escape 15 hours later (you're lucky — it could have been 34!), you're told there are still a bunch of bad guys running around the city looking for you.

Having decided that the climate just may be better elsewhere, you bring up full travel information on your CoCo screen. For only $525 and seven hours, you could be in London. Go for it! Your private jet flight is depicted on the world map now displayed on your screen. When you arrive, your first contact actually has a clue — which means not only that you now know *Ockywoky* is not ambidextrous, but also you pick up a $1000 bonus for such quick work. Checking off on your trusty secret agent's pad and making clever deductions, you decide to try another informant — and are promptly captured for 26 hours.

Two cities later you've narrowed the field to six agents, know where Dr. Glimm is and have two digits to his vault combination. You start to make a contact in Istanbul, only to find your funds are down to $225, too little to pay the fellow. No problem! Just wire the home office for an advance. Nice, except they only send you enough bucks to get you home to sign the papers for extra money — and what's more, it takes you 36 hours to get there (so what can a mere agent do?). Back to New York, then Istanbul . . . hey! This guy's got the third digit. Quick, to Hong Kong! Oh, didn't we tell you? That's a nine-hour flight, and you've only got eight hours left. You say you'll try to guess who the agent is, then? Dr. Hiro Yamada? No, sorry — he's not the one. I regret to inform you that you're terminated.

Ockywoky is something of a cross between CLUE™ and "Man from U.N.C.L.E." Locations of the participants and clues are randomized each time the game is played. Four levels of difficulty are provided, ranging from 10 days for the beginner to four days for the real expert. Each city has five informants. Regular clues are checked off against agent dossiers, while bonus clues may reveal Dr. Glimm's HQ or a vault digit. The computer keeps track of time and money, as well as tracking your flights and providing a wealth of travel information.

A wrong guess about Dr. Glimm's location will cost you $500. You also can accuse an agent at any time or guess at the vault combination. If you're wrong, of course, you lose. It takes some luck, naturally, but it also requires skill and planning to win, particularly at the higher levels. I eventually was able to develop certain techniques that helped me win a little more often. (What? Tell you what they are and help you get higher merit pay than me? Maybe 007 will help.)

Well-designed and packaged, *Ockywoky* successfully combines adventure, suspense and high-quality graphics to create a fun, challenging game. If you want something for the family (late pre-teens to adult) other than the usual shoot-em-ups, take a look at this product. And if you *really* get hooked, you can even buy an *Ockywoky* T-shirt. (Excuse me, but I've just been informed that Dr. Glimm is in Bombay, and I've only got six hours left — watch out for Consuelo Fialon!)

(Prickly-Pear Software, 8532 E. 24th Street, Tucson, AZ 85710, 32K Extended tape $24.95, disk $29.95)

— Warren S. Napier

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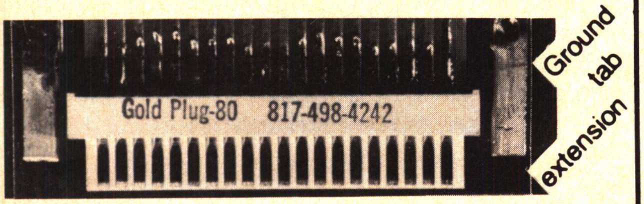

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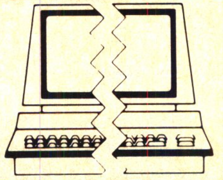

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4) A mortgage payment calculator.
5) A commission calculator.

The whole package is coded in BASIC and takes up a little more than 7K of storage.

Finance-5 is a menu-driven program. When *CLOADed* into store and *RUN*, the first thing displayed is a master menu that shows the five utilities listed above. After the user selects one of the five options, the master menu is replaced by prompts for the information needed by the selected utility such as interest rate, number of payments, and amount of principle.

After all the necessary data has been entered, the *Finance-5* utility calculates and displays the results. If the results don't fit onto a single screen, the utility puts up a single screen full of data and tells the user to hit a key to continue. This is particularly helpful when running the mortgage or amortization utilities when no printer is available.

Upon completion of the selected utility, a short action menu is displayed to allow the user to rerun the same utility, copy the results to the printer or return to the main menu. As with the master menu, the option is selected by entering the number of the chosen option.

Finance-5 is an easy to use program. Its menu format and descriptive prompts make it self-documenting and it generates neatly formatted, easy to read tables of figures. If you do a good amount of complex number crunching, *Finance-5* could be for you!

(Sigma Software, 3 Edgewood Rd., Bryans Road, MD 20616, tape $14.95)

— Gary E. Epple

The Spooler — Multitasking Without OS-9

The Spooler from Chroma Systems is a machine language utility that allows you to output a file to the printer while retaining limited use of your computer. It is a great concept but contains the limitations of all software spoolers — it uses precious RAM. This is especially critical in a machine like the CoCo with only 64K.

If you need a spooler, then you need additional hardware that is truly a spooler and will store (spool) your entire dump to the printer. If you can use a software spooler, this program from Chroma Systems is the best of those I've seen. It's easy to load and even easier to use. The instructions, screen prompts and built-in default values all combine to allow the novice to utilize the functions of this program.

The main advantages of this program lie in its ability to load a file to be printed into a buffer in RAM and then direct the output of this buffer to printer independent of other operations. You can run most BASIC programs if there are not a lot of special pokes. You can perform disk I/O if your file does not exceed the buffer length.

The best equipment requirements to utilize the performance of this spooler is a 64K machine with at least one disk drive. It will work with a 32K machine, but the restrictions imposed on the system all but exclude disk I/O.

I am very concerned in writing this report for it is rare to review a program as well done as *The Spooler*, and yet not be able to cite all sorts of uses for it. It is a strong commendation to look to Chroma Systems for other software.

The operation of *The Spooler* is remarkably easy. You are required to run a BASIC loader program which will get you to the program setup menu. One time through selecting the default values and you're off and printing and computing. Chroma-Systems has also included an extensively documented source code which, by itself, is almost worth the cost of the program in terms of learning assembly code.

The biggest obstacle in utilizing *The Spooler* is that it is not compatible with any of the major word processing programs for the CoCo.

(Chroma Systems Group, P.O. Box 366, Dayton, OH 45420, $11.95 tape, $15.95 disk w/source code, 16K, 32K or 64K)

— Ed Sehlhorst

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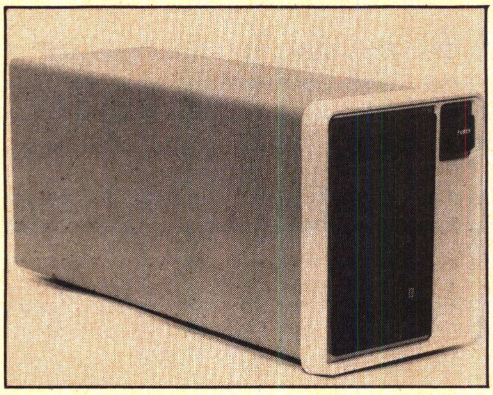

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Playing And Running *Kingshield* Is A Challenge

Kingshield is a text fantasy Adventure program for a 32K Extended Color BASIC computer. *Kingshield* is a two-part machine language Adventure. Both parts must reside in the computer at the same time. Because this program is in two parts, it is awkward to load. One of the parts resides in the graphics pages and the other in high memory. You must *PCLEAR8: CLEAR0,&H6C00* to reserve space for both parts of the program. After you have done this you have to load both programs and *EXECute* the second one — since you went through all this trouble to reserve space for *Kingshield*, it *can* coexist with another program. The very complete five-page instructions that come with *Kingshield* go into great detail about how to use *Kingshield* as a subroutine or how to call it from a BASIC program. This explanation has a very good definition and explanation of the *CLEAR*, *DEFUSR*, and *USR* commands. Also included are the entry addresses for restarting a game or continuing one you might have left by accident. All of this information is very interesting but not necessary to run the Adventure. I personally can't imagine any reason for wanting to use a complete Adventure program as a BASIC subroutine.

Kingshield itself is a fairly advanced Adventure, with a very large vocabulary of about 90 words. This Adventure is a little different than most in that there isn't a main treasure to get that ends the Adventure when you find it. In *Kingshield* you work for points, with the King's shield, the main treasure, worth the most points. You are scored on how many points you have accumulated. To gain points in this Adventure is simple some of the time.

Objects are divided into two categories: tools and treasures. It can be hard at times to tell the two apart. Some of the tools and treasures can be found just lying around, while others must be stolen or taken from guards. Some of the treasures can only be gotten if you have certain tools and are not carrying certain treasures. If all these treasures and guards weren't enough for you, there is a group of dwarves out to get you and a pirate out to steal some of your treasures.

Kingshield has three mazes and two other areas besides the main Adventuring area. Each of the three mazes has at least two exits, or so the instructions say. The two other areas are limbo and the dwarves' lair. This is a hint; try to stay out of the dwarves' lair and limbo as much as possible. If you wait around too long in either place you will die. In limbo you have to watch out for a "limbo witch," who does wander out of limbo on occasion. In the mazes you have to fight things and try to keep from getting lost, a hopeless battle. For those of you who do get lost, there are two magic words to transport you to another place in the Adventure.

As a veteran of many text and graphic Adventures, I am going to suggest some techniques to use on Adventures like this or any other that keep track of number of turns. First, start the Adventure over often — this will restart the number-of-turns counter. Second, on your first time through, make a map. Third, hurry; it will improve your score. If you try to do these three things you should be able to solve the Adventure fast and with less frustration. In *Kingshield*, a map is a must.

Overall this is an okay, but very tough text Adventure. *Kingshield* does have a lot of killing that must be done to increase your score. I think this Adventure would be better if the help command gave some help, not just the same message, and if you didn't have to kill so many things.

(Jade Products, 519 N. Scott, Wheaton, IL 60187, $18.95)

— Jeffrey Loeliger

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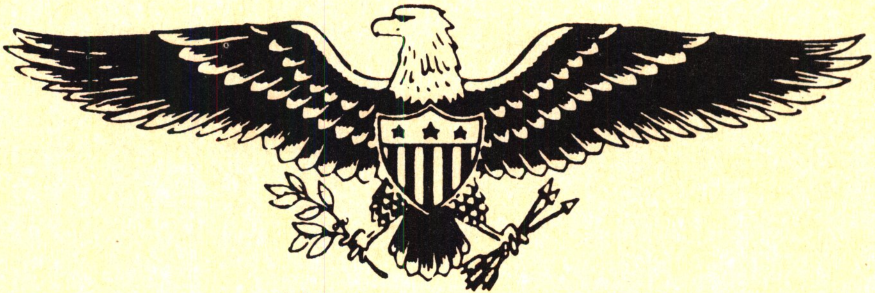

Color Micro Journal

The Color Computer Monthly Magazine

$1.95 per issue Vol. 1, Issue 2 October, 1983

THIS 'N THAT

The **BIG NEWS** this month is that **OS-9** has finally arrived for the Color Computer. The **ASTOUNDING** part of the Radio Shack OS-9 Package, besides the price, is the **DOCUMENTATION**. You 'Old Time Radio Shack Followers' will not believe what you see. Jon Shirley has been telling us that the main reason for the "lack" of documentation with a lot of their products was the restrictions placed on releasing that information by **Microsoft**; I

OS-9 on the COLOR COMPUTER

One of the "Operating Systems of the Future" is **now available** for the "little old Color Computer"; **OS-9**. Freely translated, OS-9 means "Operating System for the 6809" (OS-9 is now being written for the **68000**, also). Since it is fairly obvious that UNIX and "UNIX-Type" Operating Systems will be running on just about every computer to come out in the next few years, a whole new language is beginning to appear on the horizon.

Color Computer OS-9; the Package

We had been running a preliminary release of OS-9 on the Color Computer for a few weeks, and received the "Official Radio Shack" version for Review a couple of days ago. To put it mildly, this package is **IMPRESSIVE!** For $69.95 (Radio Shack Catalog Number **26-3030**), you receive a 9 1/2" x 7 5/8" x 2" package containing 4

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Oracle II Works Monitor Magic

The *Oracle II* is a high quality machine language monitor for the Color Computer and the TDP System 100. One definition of a monitor is "any routine which observes the progress of work in a computer system. A routine used to provide diagnostic information on the progress of a program for the purpose of debugging." (From the Penguin Dictionary of Computers ISBN 014051.0397.) Well, the *Oracle II* does this and a whole lot more.

The *Oracle II* is just under 8K long and works best in a 32K or 64K system. It works well in a 16K system, but memory left for the user is fairly restricted. Among its many features are the ability to relocate itself upon execution to the upper 32K of RAM if the computer is capable of 64K RAM (the manual states it supports the 64K NOR-gate modification as well as Spectral Associates' "Supercharger"), setting of multiple breakpoints, 10-byte ASCII or Hex search of memory, full screen display and modification of memory, disassembler, Hex to/from decimal conversion, printer support, disk and cassette I/O (cassette only in the cassette version), and a variable speed program stepper that will step both ROM or RAM routines.

The manual is well written and thorough. It begins with a copyright disclaimer and informs the buyer how to register the software with the company in order to keep informed of updates and/or corrections. The program comes on a cassette and both the cassette and disk versions are supplied and instructions are given on how to transfer the program onto disk. Instructions are also given on how to modify the program when saving it to allow it to automatically relocate itself to the upper 32K RAM when it is initially *EXECuted.* Since the program is fully relocatable, instructions for 16K and 32K users are also given allowing the program to reside at the end of memory by initially *CLEARing* memory to protect *Oracle II* from BASIC's stack.

All the commands used by the *Oracle II* from the command mode consist of a single letter, except to enter the stepper routine, which requires the [SHIFT] key preceding the character. The commands allow you to perform the following functions:

- page through memory that is being displayed on the screen and select ASCII or Hex display,
- select the page in memory that the *Oracle II* will use as its monitor screen,
- select a video graphics mode from the same ones that are supported by BASIC and Extended BASIC and select a page in memory where the graphics page(s) will start,
- toggle between the *Oracle II* screen and the graphics screen,
- alter memory,
- set up to three breakpoints, clear any or all of them, and re-enter a program after a breakpoint has been encountered,
- jump to any specific address for the purpose of running a machine language program or routine under *Oracle II*,
- load and save machine language files from tape and disk,
- move a block of memory to another location,
- fill a block of memory with a specified value,
- modify a specific register or registers,
- return to BASIC
- search memory for an ASCII or Hex string of up to 10 bytes in length,
- transfer a machine language file from tape to disk,
- relocate itself to the upper 32K of memory above Disk BASIC if 64K is available,
- disassemble memory to printer or screen, and
- single step machine language programs while displaying the output on the screen and the printer, controlling the step speed, choosing to single step the ROM routines or just pass through them, choosing to single step subroutines or just pass through them, and step through all interrupts through their interupt routines.

In addition to a good description of all the commands, there is also a practice tutorial which leads the user through writing, testing, stepping and saving a machine language program. I recommend going through this section to all first-time users of the program. At the end of the tutorial, there is an assembler listing of a test program. If the instructions in the tutorial are followed there should be no problem, but if you wish to key the assembly version instead of just the bytes, then there is an error to be noted in the manual I received. In the routine labeled LOOP4, the line LEAU TABLE,PCR should read LEAU TABLE1,PCR. I guess not much more can be said about the manual, but I would like to see more companies publish the source listing along with their instructions to give users more insight into machine language programming and techniques.

The program also comes in a FLEX version at a higher cost. It is well written and contains a lot of features not before available in a monitor for the Color Computer. I would suggest that this program not be tackled by the beginner, for some knowledge of machine language programming is a definite asset in understanding the operation and control of *Oracle II.*

(Micro Magic, P.O. Box 142, Sumner, WA 98390, $35.95 for the CoCo version, $45.95 for the FLEX version)

— Eldon Doucet

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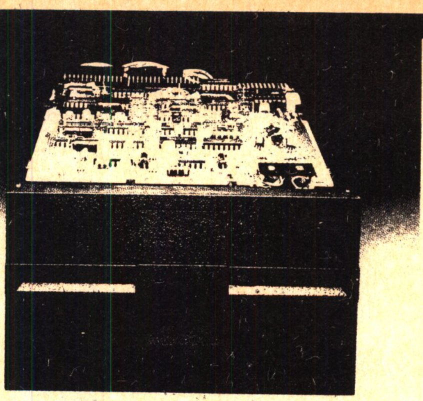

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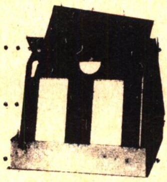

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ODEC BASIC Offers New Commands, Functions

The CoCo's BASIC language has so many commands and functions that, at first glance, you might think that no more would be needed. But, after a while, you begin to see that some things were left out. "I wish I could change to green characters on black instead of black on green," you might say, or "I wish I could just send a file to the printer instead of going back into the word processor," or any of a number of other things. Thomas P. Olk may have just what you need with *Olk Disk Extended Color BASIC (ODEC)*, which gives you a number of new features.

The first thing that *ODEC* does is change the step rate from 30 milliseconds to an unspecified faster value. This speeds up disk operation a bit. (If you find that your drives can't handle the faster speed, you can use a different loading procedure to use *ODEC* at the normal speed.)

Once it's in place, *ODEC* adds quite a few new commands and functions. Here they are:

DIR: When you call up the directory, the listing is in alphabetical order instead of the order in which the entries are placed on the directory track. LDIR will give a listing on your printer (the same result that you get with *POKE 111,254*).

You can also narrow down the directory listing by giving part of a filename in the command. DIR"*/BAS", for instance, will list only those files ending in /BAS. DIR "BOOKRVW/*" will return the files named BOOKRVW with any extension. DIR"BOOKRVW/TXT" will list the filename and other information on BOOKRVW/TXT.

DOS: This command boots OS-9 directly, even if you have the old disk ROM. The only time it would be useful is if you had been using *ODEC* and decided to use OS-9; it's otherwise rather pointless, because who wants to load in *ODEC* to boot OS-9 when the boot program can do it just as easily?

DPEEK, DPOKE: These commands let you *POKE* or *PEEK* two-byte values (ranging from 0 to 65535 decimal or &H0000 to &HFFFF) to or from two consecutive memory locations. This saves all that *PRINT PEEK(100) * 256 + PEEK(101)* stuff; *PRINT DPEEK(100)* will now do the same thing.

HELP: This simply lists all the new command and function words on the screen.

INVERSE, NORMAL: These let you switch back and forth between the normal black characters on green and green characters on black. One problem is that the background of reversed characters is not black, but dark green, because the encoded color signal for green is still present. I found that reversed characters were much more difficult to read than the normal CoCo display.

NLOAD, NSAVE: These commands let you load ASCII text files into memory for editing in BASIC and then save the ASCII file back to disk without line numbers. They are rather slow (because of all the adding or removing of line numbers that goes on), and the method is not intended to replace regular text editors.

OLD: This command recovers a BASIC program or text file that was deleted by the NEW command. If nothing was put in memory to replace it, an old program can be recovered.

TYPE: This will type an ASCII file on the display and let you slow down, speed up or pause the listing. LTYPE does the same thing using the printer.

HEX2$, HEX4$: These functions convert a decimal number to a Hex string; the big difference is that the result is forced to either two or four characters in length, respectively.

Disk E-X-T-E-N-D-E-D Color BASIC does have some very nice features. How useful it is depends on how much BASIC programming you do.

(Spectrum Projects, 93-15 86th Drive, Woodhaven, NY 11421, $24.95)

— Ed Ellers

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I put jargon in its place, too. If you've ever been intimidated by genius programmers, you'll know what I mean. You'll be able to drop a few accumulators, registers, and zero-indexed offsets into your conversation, too.

So contact me or RB2-3 at Green Mountain Micro. "Micro Language Lab" comes in a notebook containing twelve cassettes, documentation, workbook, and data booklets. It costs $99, plus $4.50 shipping and handling. Z80 and 6502 Labs will be available shortly.

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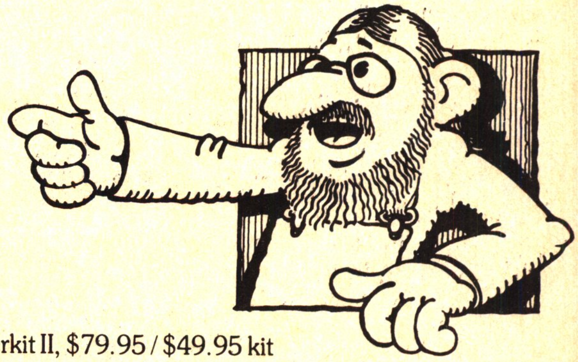

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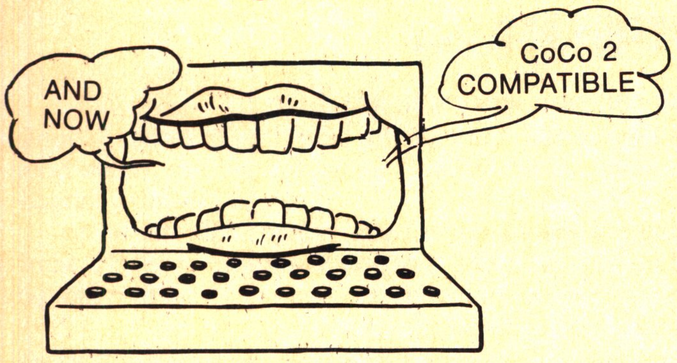

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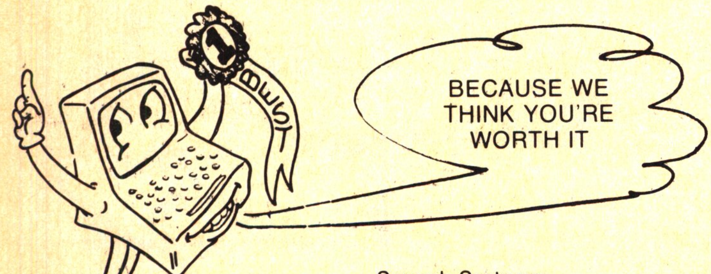
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Documentation	30 pages
Software	2 tapes
IC count	6
Case material	Aluminum
Case size	15/16 x 5½ x 4¼
CoCo 2 version	Yes
Expansion Unit Compatibility	
RS Multi-pak	Yes
BT-1000	Yes
Spectrum Switcher	Yes
Y-Pak	Yes
Y-Cable	Yes

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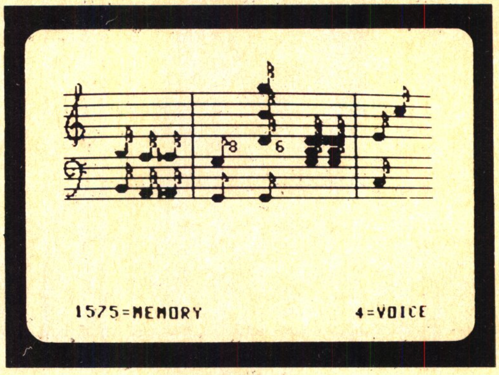

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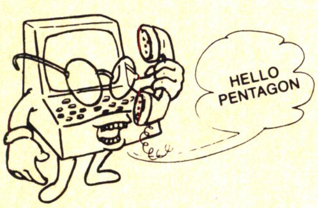
(Smart)



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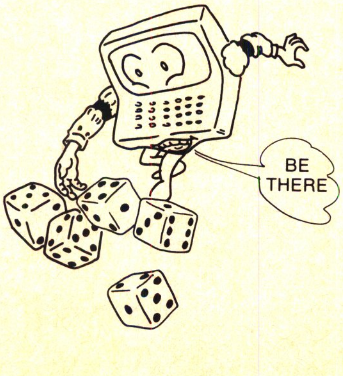

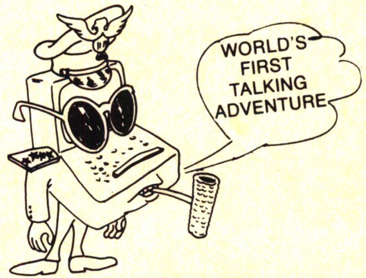

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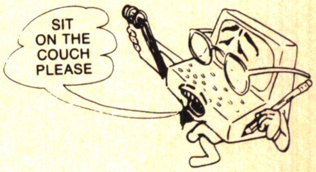
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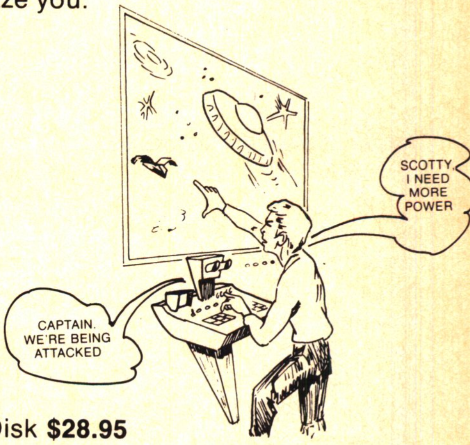

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*Termtalk requires the Speech Systems Voice

Convert BASIC To Machine Language With *Color Compiler*

Speed. Is that what you're after? Then machine language programs are what you desire. But some of us are not ready for machine language programming. That's where a BASIC compiler comes in. It takes a BASIC program and "compiles" it into machine language code, which then can be executed on its own (as well as being called from a BASIC program). One of the newest CoCo compilers on the market is Computerware's *Color Compiler*. This compiler recognizes quite a few commands and functions in BASIC as well as Extended BASIC. The functions supported are: *ABS, INKEY$, JOYSTK, PEEK, PEEK#* (which returns a two-byte value instead of one), *PPOINT, RND, SGN, SQR* and *TIMER*. The commands supported are: *CIRCLE, CLS, COLOR, DATA, DIM, END, EXEC, FOR . . . TO . . . STEP . . ., GET, GOSUB, GOTO, IF . . . THEN . . . ELSE . . ., LET, MOTORON(OFF), NEXT, ON . . . GOSUB, ON . . . GOTO, PAINT, PCLS, PCOPY, PMODE, POKE, POKE#*, (pokes a two-byte value instead of one), *PRESET, PRINT, PRINT@, PSET, PUT, READ, REM, RESTORE, RETURN, SCREEN*, and *SOUND*. So you can see, a large subset of available commands in BASIC and Extended BASIC are supported.

The *Color Compiler* has been designed with many graphic commands, making it well suited for writing graphics games and educational software in BASIC and then compiling the program using the *Color Compiler* to achieve greater speed. Computerware's claim is an average of 42 times increase in speed with some functions as much as 60-70 times. Examples are given in the manual to demonstrate this and are fairly accurate. I tried some of the examples that are included on the disk and explained in the manual, and the differences are amazing. Watching something in BASIC and then seeing the same thing in machine language a few minutes later makes one fully appreciate the power of machine language.

The *Color Compiler* requires a 32K Disk system since it reads in the BASIC program to be compiled directly from the disk, and it doesn't require that the source program be saved in ASCII! The program produces an output to screen or printer (using the default Baud rate of 600) of all the necessary information to save and reload the machine language program produced by the *Color Compiler*. *START, END* and *EXEC* addresses are given, as well as a *CLEAR* value so that BASIC's stack can be adjusted upon loading and executing the machine language program. A variable can even be passed from a BASIC driver program to the machine language code via the *USR* function.

Compiling takes a little while, increasing in time with the length of the source program, but it's worth the wait! Error codes are set up in the *Color Compiler* to direct you to any areas which the *Color Compiler* does not like. A list of restrictions is given, and instructions are given if they can be modified. Some of the restrictions to take note of are program length to be compiled and the number of line references (i.e., *GOSUBs, GOTOs*, etc.) are dependent upon memory available. String variables of any type are not allowed. This is one area which I found disappointing. A lot of programs that I write use string variables and a lot of work to convert them to numeric variables is called for in order to get the *Color Compiler* to compile my programs. Only single letter variables are allowed, as well as single letter *DIMmed* variables. The *Color Compiler* does not understand decimal values, only integer, although the remainder from a divide can be obtained using a special command allowed by the *Color Compiler*. Multi-level parentheses are allowed as well as complex *IF . . . THEN . . . ELSE* statements.

Some of the commands you may be used to from Extended BASIC have been modified slightly, and they should take no time to get used to. One example is the *CIRCLE* command. The height-to-width ratio is now defined as 0 to 1024, instead of 0 to 4 to allow for only integer values to be used.

The machine code produced by *Color Compiler* is fully relocatable and can be placed anywhere in memory. It uses routines in the BASIC and Extended BASIC ROMs, so be sure they are there when the machine code is executed.

The manual is well written and detailed, and includes a technical information section on the *Color Compiler* for people wishing to add commands to the *Color Compiler* and explains the subroutines used in the program.

Although not a complete compiler, it does perform well within its limits, and the speed achieved with machine language is well worth the effort to change some of your programs to work with the *Color Compiler*. The lack of the *DRAW* command supported can be a bother, but the *LINE* command should suffice along with the other graphics commands. Maybe a cassette version would be nice, but the overhead required to perform the operations with a cassette could be too large. Time for a disk!

(Computerware, P.O. Box 668, Encinitas, CA 92024, 32K disk $39.95)

— Eldon Doucet

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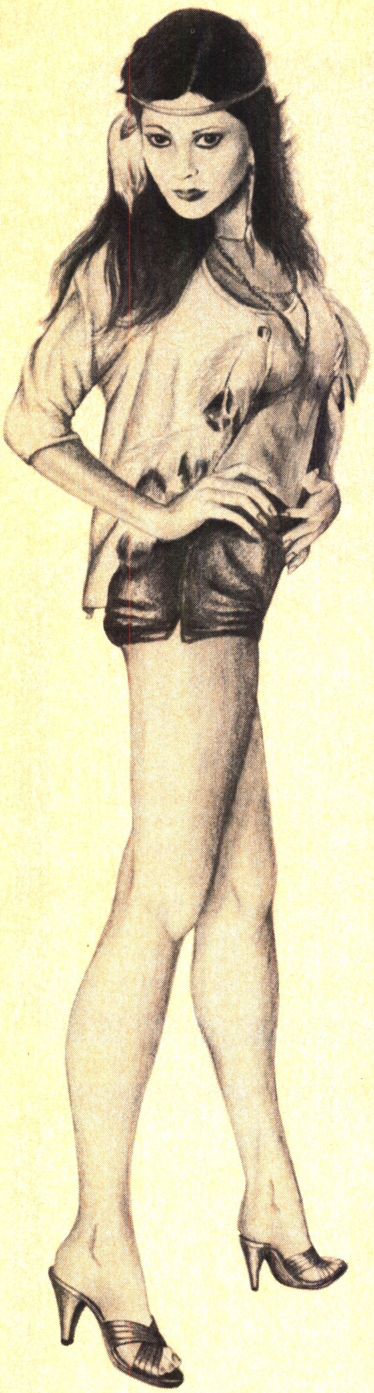

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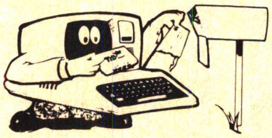

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EXECCART BY PETER KARWOWSKI

EXECCART is a M/L program that allows you to copy ROMPAC programs to tape. They can then be loaded back into a 64K CoCo and examined or modified. You can run most of your ROMPAC's from disk without ever having to remove the disk controller. This saves tremendous wear and tear on the contacts. EXECCART may also be used to add a loader to your own programs to turn on 64K and to copy your BASIC ROMs into RAM so that you can make modifications.

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THE SPOOLER BY PETER KARWOWSKI

Whenever you use your printer, your computer is totally dedicated to feeding it. This isn't such a problem when you just want to print out a couple of lines, but LLISTing a long program can be very boring. If you have better things to do than sit around waiting for the printer, then "THE SPOOLER" is just what you need. THE SPOOLER will work on ANY TRS-80 Color Computer from a 16K right up to 64K with disks. Extended BASIC is NOT required.

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SWISS ARMY KNIFE BY RALPH BLOCH

One of our most prolific authors (PRETTY PRINTER-P.U.F.F.-LIBRARY) has come up with another winner. As the namesake of this program has many blades so SAK has many functions. The disk owner will find it indispensable for diagnosing and fixing the many gremlins that attack a disk system. It will work on any number of tracks and can even read FLEX disks. By copying one sector at a time you can often save an otherwise uncopyable disk.

CAT# DM553 32K $29.95 (CAN) $25.50 (US)

SUPER EDIT BY LARRY LANDWEHR

This powerful new utility program from the author of "IN ASSEMBLY LANGUAGE" adds many new editing commands to Basic. You can PRINT one screenful at a time, DELETE a line or lines, JOIN several lines together and hide your programs, or FIND strings and variables. Also included are commands to INSERT, COPY, MOVE & REPLACE one line or a block of lines. Super edit works with Extended Basic but Extended Basic is not required.

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MUSIC EDITOR BY PATRICIA SHELTON

This program will take regular sheet music and convert it to "play by number" music. You enter the words, notes and chords from the keyboard and the program will output, to the screen or printer, an easy to read version for C or G type organs. Your files can be edited and saved to disk or tape. Easily produce a songbook of your own favorite tunes.

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* * * * * * * * * * * * * * * * *

HOME INVENTORY BY JEFF PYNE

Home Inventory was written for the average home owner to simplify the tedious task of weeding through his posessions. This small database will save an organised list of brand names, serial numbers, values, dates of purchase etc. This could prove to be your most valuable program if you ever have to deal with an insurance company so be sure you have a copy of the programs output in a save place in case of fire or theft. Ext Basic required-Printer optional

CAT# DM013 16K $12.95 (CAN) $10.95 (US)

Math Drill Is Fun With *Tic-Tac-Toe Math*

Some of the most popular educational programs for home computers are mathematical games, which make math drill fun. *Tic-Tac-Toe Math* from Harmonycs is a worthwhile entry in that field.

The program allows two players to play tic-tac-toe, but they have to earn their X's and O's by answering arithmetic drill problems. Young children find tic-tac-toe a lot of fun, and mine, ages four and seven, enjoyed playing this game. During the course of playing the game, they got a good math drill, too.

After the opening credits, the program has each player type in his or her name, and choose a difficulty level ranging from "simple" to "difficult." This feature allows younger and older children to play together. The players then have to choose which game to play: addition, subtraction, multiplication, division, or hi-lo. In this last game, the program randomly chooses a number in a given range, for example from zero to 100, and the player makes a series of guesses, continually narrowing the range, until he or she guesses the number.

After the choices have been made, a tic-tac-toe grid is displayed, and the players are asked, by name, to choose a square. They're then given a drill problem to solve, and they're given their X or O when they type in the correct answer. The program does a very good job of handling incorrect answers. Incorrect answers are not accepted, and don't appear on the screen. If a player gives an incorrect answer to a problem three times in a row, the program displays the correct answer, and gives the player another problem. Thus, there is no penalty for incorrect answers, a sound pedagogical principle. Finally, when one player has won, or all the squares have been filled, an appropriate message is displayed, and the players are given the opportunity to play another game.

The program is well-designed, and works flawlessly. It uses low resolution graphics, and makes very good use of color and sound throughout.

I would change a few features of this program if I could, and hope the author will consider making some changes. After each correct answer, an encouraging message is displayed, like "That's great!" Unfortunately, some of these messages pin labels on the child, like "You're a brilliant child!" I think these messages should praise the child's *work*, rather than labeling the child. Another feature I don't like is the "Report Card." After each game, a report card is displayed for each player, showing the number of problems attempted, the number correct, and the percentage right. The children playing the game aren't interested in such a summary, and it interferes with the idea that this is play, not schoolwork. I think this summary would be more useful if it were displayed only on request

If you want to encourage your children to practice their math skills, and want them to have some fun at the same time, consider *Tic-Tac-Toe Math*. This program has solid educational value, and good play value, too. Your children should get many hours of enjoyment and learning from it.

(Harmonycs, P.O. Box 1573, Salt Lake City, UT 84110, 16K ECB tape $11.95)

—David Finkel

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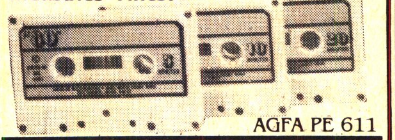

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We believe VDOS is the greatest advancement for CoCo since the introduction of the disk drive itself. And, at less than $100, it is so inexpensive you can't afford to be without it. If you have the "cassette blues," VDOS *is* the answer!

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RAINBOW CERTIFICATION SEAL

RAINBOW Info

How To Read Rainbow

Please note that all the BASIC program listings you will find in *the Rainbow* are formatted for a 32-character screen — so they will show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little cassette symbol on listings indicates that program is available through our *Rainbow On Tape* service. An order form for this service is on the insert card bound in the magazine.

RAINBOW
CERTIFICATION
SEAL

The Rainbow Seal

The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product which carries the Seal has been physically seen by us and that it does, indeed, exist.

Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to *the Rainbow* for certification. We ascertain that their products are, in actuality, what they purport to be and, upon such determination, award a Seal. This lets you know that we have seen the product and that it does, indeed, exist.

The Seal, however, is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in *the Rainbow* and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.

Using Machine Language

Machine Language programs are one of the features of *the Rainbow*. There are a number of ways to "get" these programs into memory so that you can operate them.

The easiest way is by using an Editor-Assembler, a program you can purchase from a number of sources.

An editor-assembler allows you to enter mnemonics into your CoCo and then have the editor-assembler assemble them into specific instructions that are understood by the 6809 chip that controls your computer.

When you use an editor-assembler, all you have to do, essentially, is copy the relevant instructions from *the Rainbow's* listing into CoCo.

Another method of getting an assembly language listing into CoCo is called "hand assembly." As the name implies, you do the assembly by hand. This can *sometimes* cause problems when you have to set up an ORIGIN statement or an EQUATE. In short, you have to know something about assembly to hand assemble some programs.

Use the following program if you wish to hand assemble machine language listings:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE";B$
40 POKE I,VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the &H3F00 in Line 10 to &H7F00.

What's A CoCo

CoCo is an affectionate name which was first given to the TRS-80 Color Computer by its many fans, users and owners. As such, it is almost a generic term for three computers, all of which are very much alike.

When we use the term CoCo, we refer to the TRS-80 Color Computer, the TDP System-100 Computer and the Dragon-32 Computer. It is easier than using the three "given" names throughout *the Rainbow*.

In most cases, when a specific computer is mentioned, the application is for that specific computer. However, since the TDP System-100 and TRS-80 Color are, for all purposes, the same computer in a different case, these terms are almost always interchangable.

Rainbow Check PLUS

The small boxes that you see accompanying programs in the *Rainbow* "Check system," which is designed to help you type in programs accurately.

Rainbow Check PLUS will count the number and values of characters you type in. You can then compare the numbers you get to those printed in *the Rainbow*. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS*, type in the program and *CSAVE* it for later use, then type in the command *RUN* and press [ENTER]. Once the program has run, type *NEW* [ENTER] to remove it from the area where the program you're typing in will go.

Now, whenever you press the down arrow key, your CoCo will give you a checksum based on the length and content of the program in memory. This is to check against the numbers printed in *the Rainbow*. If your number is different, check the listing carefully to be sure that you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on page 21 of the February 1984 *Rainbow*.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR25,X-1
30 X=256*PEEK(35)+178
40 FOR Z=X TOX+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182,1,106,167,140,60,134
100 DATA 126,183,1,106,190,1,107
110 DATA 175,140,50,48,140,4,191
120 DATA 1,107,57,129,10,38,38
130 DATA 52,22,79,158,25,230,129
140 DATA 39, 12, 171,128,171,128
150 DATA 230,132,38,250,48,1,32
160 DATA 240,183,2,222,48,140,14
170 DATA 159,166,166,132,28,254
180 DATA 189,173,198,53,22,126,0
190 DATA 0,135,255,134,40,55
200 DATA 51,52,41,0
```

Software Review

You're In The Money With *Horse Race*

Seattle Slew isn't running today, but you may still expect all the thrills and excitement with horses like Rainbow Rage, High Res, and Jumping Joystick. These and other horses will be running for the money in today's races at Computer Downs, provided you're playing *Horse Race*, a delightful game from Computer Island.

The game will allow up to five players to test their "horse sense" in picking the winning entries in the six races on today's card. Each player starts out by entering their name and is given $20 to start. Next, you are shown the first three entries running in the first race and their odds. The betting window is now open. Each player is asked, by a charming old window teller, which horse he wants to bet on, and the amount he wishes to wager. Once all the bets are in, the betting window closes. Sit tight, you will be entertained by a call to the starting gate. And they're off. . . . You'd better start cheering your favorite on, for it's very hard to determine the outcome of the race. Some are right down to the wire.

Horse Race, from Computer Island, will surely give you and your family hours of enjoyment. The combination of graphics and sound just add to the delightful time you will have with this program.

(Computer Island, 227 Hampton Green, Staten Island, NY 10312, tape $11.95)

— Ted Hasenstaub

See Page 137

- a lot of software for a little silver

Corrections

In Paul Hoffman's article, "Converting *Micropainter* to Disk" (March 1984, Page 132), there is a bug in Listing 1 which does the conversion. One of the buffer areas used in the magnification mode is set too low in memory and writes over part of the BASIC I/O program. Alter line 240 of Listing 1 to read:

```
240 DATA 460B,44,4619,62,461E,6E
,4625,B8,4629,0E,462B,43,462E,43
```

The change is in the data for location $4619 from $2E to $62. If you have already converted the cartridge program to disk, you can *LOADM*"MICRODSK", then *POKE* &H4619, &H62. Resave MICRODSK with *SAVEM* "MICRODSK", &H4000, &H498B, &H4000.

In Listing 2 of the *Micropainter* article, line 310 should be altered to read:

```
310 IFPEEK(&H72)<>&H41 THENEXEC&
H4000 ELSEPOKE&H68,0:POKE&H69,0:
EXEC&H411D
```

In the listing for "Up, Up, And A(merican)way" (March 1984, Page 74), the variable END$ in lines 2970 and 2980 should be changed to EN$ since END is a command word. The corrected listing is shown below.

```
2970 CLS:PRINT:INPUT"ARE YOU SUR
E? PROGRAM WILL BE   ERASED!!  (
Y/N)   ";EN$
2980 IF   EN$="Y"THENPOKE113,0:EXE
C40999ELSEGOTO160
```

In Dave Clements' *Piegraph* listing (January 1984, Page 189), please note these clarifications and corrections:

GSPRP is not included in *Piegraph*. It, or another screen print program, must be purchased in order to dump the Hi-Res graph plots to a printer.

For those readers who have *GSPRP*, it must reside in memory starting at location &H7D90. If not, line 50 must be changed accordingly.

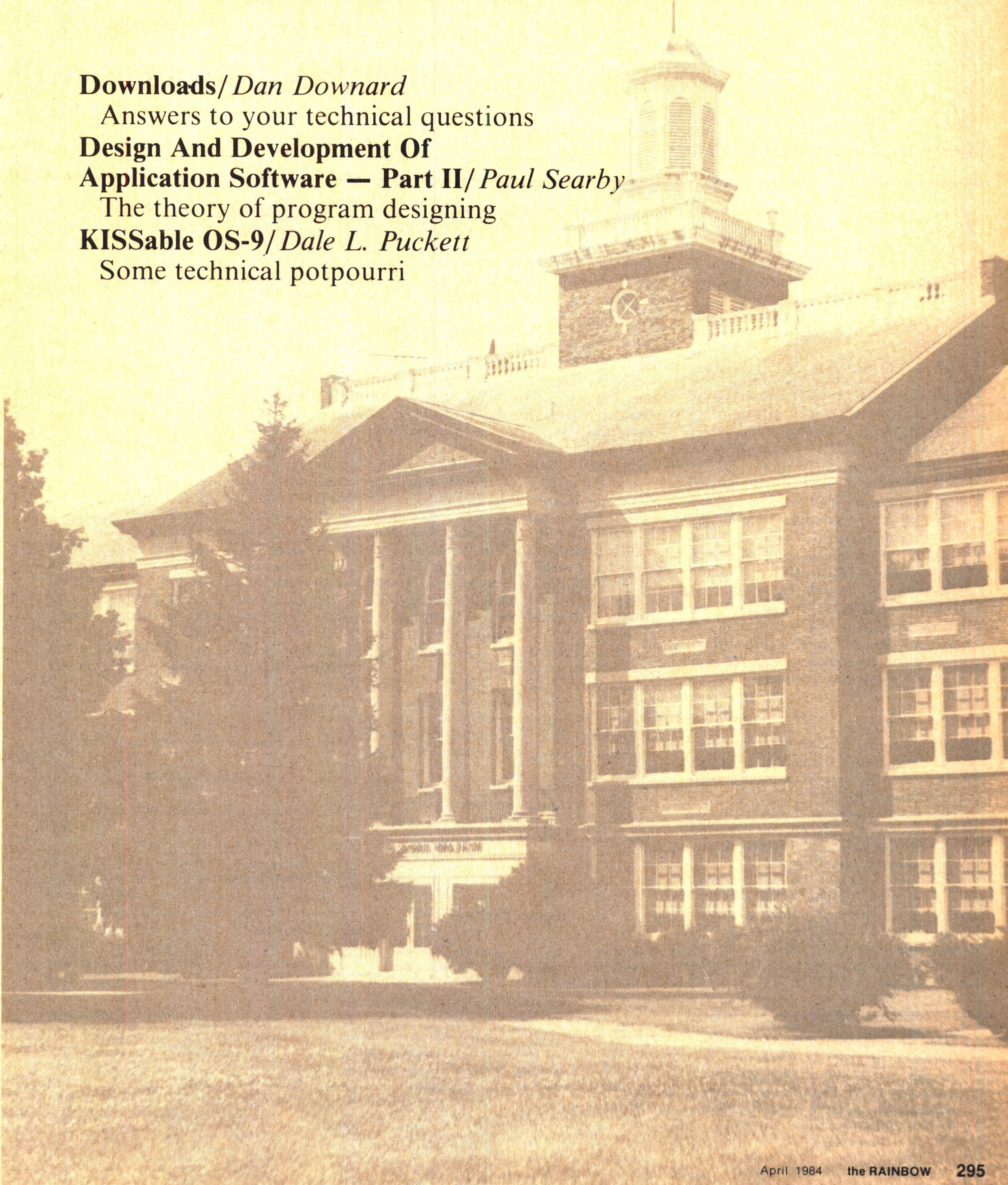
Each modification in the article — operation without printer, 16K, and cassette, etc., are independent corrections. That is, if you do not have a C. Itoh printer, you must make the corrections listed in that paragraph. If you do not have a disk system you must also make the corrections listed for a cassette operation. For example, a 16K cassette system without printer would require that all corrections be made, not just those listed for 16K.

For operation without printer, delete GOTO520 in line 160.

For cassette operation, change WRITE#1 to PRINT#-1 in line 1510 and change the end of line 1540 (after SCREEN1,0:) to CSAVEMFI$1536,7679,380:RETURN.

RAINBOWTECH

Downloads/*Dan Downard*
Answers to your technical questions
Design And Development Of Application Software — Part II/*Paul Searby*
The theory of program designing
KISSable OS-9/*Dale L. Puckett*
Some technical potpourri



RAINBOWTECH

DOWNLOADS

E Board Upgrade Attempts Meet A Measure Of Resistance

By Dan Downard
Rainbow Technical Editor

I have read in a number of different articles that when upgrading an E board to 64K the staking pins next to R83, just left of C44, should be jumpered using a 33 ohm resistor. Is the resistor necessary, and what does it accomplish?

Stan A. Kucera
Winnipeg, Manitoba

Stan, see the following.

• *I have run into a problem I hope you can help me with. I ordered an upgrade kit from MichTron Software Company in Pontiac, Mich., to bring my 32K CoCo up to 64K. I have an E board and followed their instructions very closely. I could do all of the revisions except item #6. [Solder the two staking pins, to the left of C44, together.] The staking pins mentioned here are completely nonexistent in my 32K machine. I called MichTron a number of times. They said that they could not help me over the phone and could offer no other advice. I have sent the chips back to them and still want to do the upgrade. I have the program from Radio Shack to test the availability of 64K. Can you please advise me on this situation?*

Dave Unger
Cape Girardeau, MO

David, I think your problem may have one of two solutions. You either don't have an E board or the factory has already made the modification for you.

First, let's establish which board you have. Remove the seven screws on the bottom of your CoCo. Carefully remove the top case revealing the circuit board.

If you have a D or E board you should notice a number similar to 8709137-D or 8709137-E on the right hand side of the board immediately below the expansion ROM port. Only the E boards have the staking pins in question. They are located between C44 and the SAM chip.

If you have a 285, sometimes called an "F" board, the circuit board revision will be on the left side near the bottom and will be similar to 8709285. Look immediately above the top left side of your keyboard.

Just as a matter of information, the 64K CoCo has a 285 board, and the boards in the CoCo 2s have been completely redesigned.

After determining which board you have, follow the instructions supplied by the supplier of the chips. If you don't want instructions and just want to buy the chips, you need eight 4164s. In this case follow the instructions that have appeared several times in *the Rainbow*.

The other solution to your problem may be that the factory has already made this part of the modification for you. The two staking pins in question are designed for installation of a 33 ohm resistor (R83) when 32K is installed on a "D" or "E" board. They connect the SAM chip (U10-Pin 35) to a 74LS02 (U29-Pin 11). This line is referred to as MA7, or the 7th bit of the address line going to the RAM chips. This resistor is recommended but not absolutely necessary. On the 285 board this resistor has been replaced by a ferrite bead.

Since you already had 32K, the line was probably already installed. If you look closely you will see either a resistor or a jumper where the staking pins should be located. Immediately above this location should be the label R83.

Look in "Downloads" in the March 1984 *Rainbow* for a program that will tell you if you have 64K. It will not test the memory chips, but will tell you if they are working.

(Dan Downard is an electrical engineer and has been involved in electronics for 24 years through ham radio [K4KWT]. His interest in computers began about five years ago and he has built several 68XX systems.)

Program Exchange

• *I am on a short budget, and I am always looking for the easiest way to achieve an end. Is there an easy way to transfer programs between a CoCo and VIC-20, short of using modems and intelligent terminal programs (or by a lot of typing), such as making ASCII files on tape, etc.? I realize we are subject to memory limitations, differences in BASIC, etc. These we plan to edit out. Can a CoCo and VIC be made to read each other's tapes?*

Randolph D. Carney
Lancaster, PA

We know of no available software to accomplish the direct transfer of tape information, but we can offer a suggestion, Randolph. Any computers can exchange information by the use of intelligent terminal software. What we normally refer to as "intelligent" is the fact that the program has some kind of buffer and control over that buffer from the keyboard. You are usually limited to the exchange of ASCII data, or programs.

The only other prerequisite is that both computers have an RS-232 interface. RS-232C is a hardware interface standard defining the signal levels and connections necessary for the exchange of information between computers. Normally a 25-pin DB25P, or S, is the standard connector used. The CoCo uses a 4-pin DIN plug but the signals are RS-232 compatible.

Modems are not necessary. The only thing a modem does is convert the ASCII data into tones, and vice-versa, so they can be transmitted, and received, over a telephone line. Again, assuming an RS-232 port is available on both computers, I know of at least one available for the VIC-20, you can hardwire the two computers and exchange programs.

Easy Upgrade

• *Has* the Rainbow *published any articles concerning the subject of upgrading a 16K Extended BASIC CoCo to 64K?*

I just bought my sister a 16K CoCo with the idea of upgrading it myself to 64K when the warranty lapses. I upgraded my own CoCo which had an E board (not a II).

I would appreciate any information you can give me concerning the upgrade. I have a suspicion that maybe Tandy has already equipped the CoCo 2 with 64K RAM. Am I right?

Judith L. Almendariz
Arlington Heights, IL

To upgrade a CoCo 2 to 64K, just replace the 16K chips with 64K chips, eight 4164s. A jumper is required on the board. Two solder pads identified as W1, adjacent to the 6822 PIA chip in the center of the board, must be connected using a short piece of small gage wire. That's all there is to it, Judith.

What's Up, Doc?

• *I am writing to ask for help. I am using a 16K ECB CoCo. Many of the aritlces in your very excellent* Rainbow *have this ∧ mark to be typed in.*

My CoCo does not have a key which makes this ∧.

James Cameron
Parrsboro, Nova Scotia

The character you are referrring to, James, is called a carat. It is the symbol for an up-arrow on most printers.

Offset Loading

• *In the article "E Z Graphics," Page 160, November 1983, the writer states "First, tape and disk versions cannot be interchanged unless they are offset loaded, which can be tricky." I wonder if you could explain "offset loading," because I have just purchased a disk drive and one of those utilities which promise to copy tape to disk, thinking I could put all my programs onto disk and never have to wait around while the cassette player grinds through its act. Of course, nothing seems to work the way you figure it will, or is advertised, so I have programs which are still on tape because I simply do not know how to get them onto disk. Offset loading seems to have some influence in this direction and I'm surely not the only one who has the problem.*

Ray S. Preston
Rarotonga, Cook Islands

Ray, offset loading is a method of loading a machine language program into memory at a different location than normal. To save a machine language program you would normally specify the starting address such as:

```
(C)SAVEM"PROGRAM", starting address, end address, execution address
```

Let's say the starting address for a program was 1536, or &H0600. This the starting address of many games written for Extended BASIC. Why? It just so happens that &H0600 is the first available memory after the text screen.

This is where your new disk drive enters into the picture, Ray. Disk Extended BASIC uses the memory from &H0600 to &H0DFF as buffers for the transfer of information from the disk system to RAM. The first usable memory location is now &H0E00. Programs located at &H0600 will no longer run. They will not even load.

Machine language programs for the 6809E microprocessor can be written in "position independent code," or PIC. This means that the same program located at &H0600 will run anywhere in memory if it's PIC. Try the following:

```
(C)LOADM"PROGRAM",&H0800
```

This will load your program that used to start at &H0600 with an offset of &H0800, or at &H0E00. If you wish to save the program at this address add &H0800 to all three of the original addresses e.g., start, end and exec.

It's easy to add hex numbers with Extended BASIC. To add &H0600 and &H0800 just type:

```
?&H0600+&H0800
```

Your computer will answer with:

```
&H0E00
```

If your program does not run after offset loading it probably wasn't written in PIC. Don't give up. With a short machine language program you can move it back to its original location after offset loading it from disk. Try the following program:

```
START LDX #BEGIN1 Original starting
          address
      LDY #BEGIN2 Offset loaded start-
          ing address
      LDU ,Y++ Get offset loaded byte
      STU ,X++ Store at original address
      CMPY #END2 End of program?
      BNE START Keep moving

      RTS Return to BASIC
```

Practical *PEEK*

• *Is there a simple method to tell if a disk drive is plugged in or not by using a few* PEEKs *or* POKEs *so that a program can distinguish between a disk or cassette-based system?*

Stephen Lai
Palatine, IL

?PEEK(&HC000) with a disk system installed should return 68 or &H44, Stephen.

It's Remotely Possible

• *I have a 32K Color Computer (cassette only, no printer). I would like to hook this up to a modem and operate it as a remote terminal to a VAX computer running VAX/VMS 4.3 software. The VAX supports dial-in, remote lines of varying types, 300-1200 Baud, full, half duplex, etc. Various modems are available to me.*

What software is recommended for the Color Computer? How can I obtain a copy? Can I get the Color Computer (Color BASIC *only at this time) to emulate a VT-52 or VT-100 with short line lengths?*

Joseph Lee Kenty
Birmingham, MI

There are many programs available that will suit your needs, Joe. A few that come to mind are *V.I.P Terminal* by Softlaw, *AUTOTERM* by PXE Computing, the *Color Connection* by Computerware, *Colorterm+Plus+* by Double Density Software, and *Colorcom/E* by Eigen Systems. Just look in *the Rainbow* ads for a source of supply.

All of these programs will work fine. I don't completely understand how closely you want to emulate the VT-100. Some of the above programs have high density screens, thereby eliminating "short lines," but you may find a few control sequences that will be different. The end result, though, is that you can talk to the VAX without having a VT-100.

Make Room For Memory

• *I have a 32K Extended* BASIC *Color Computer with two disk drives.*

After reading glowing reports about BASIC09 *I updated the computer to 64K and purchased OS-9 and* BASIC09. *The attempt to load* BASIC09 *failed due to lack of memory (OS-9 needs 20K and* BASIC09 *needs 22K).*

I was told by Radio Shack experts to remove some files from OS-9 disk and load BASIC09 *on the same disk.*

After loading OS-0 and BASIC09 *I found that total memory left for program and data was 21K with none reserved for graphics. I had more than 27K on my old 32K system. Some of my old Extended* BASIC *programs will not run on the 64K* BASIC09 *system due to the lack of memory.*

Should I use Hi-Res screen, my total memory would be only 12K. Is that improvement?

Z.A. Haas
Plantation, FL

With OS-9, BASIC09 and OPAK installed, I am getting about 11K for BASIC programs, but that's plenty for any programs I have run so far.

The 11K is a limitation only for writing the program. After using the Editor, and maybe the *DEBUG* module, in BASIC09 to write a series of procedures, you should save them to your execution directory using BASIC09's *PACK* command. Also, copy the *RUNB* module to this same directory. You will no longer need BASIC09 to run the programs. This will allow about 20K of buffer space for BASIC.

To run the program, enter the proper execution directory using the *PXD* command and simply type the program name. *RUNB*, the routine module, will load each procedure from disk as required and you'll be on your way.

I would say that this is a great improvement over what I'm used to. Read Dale Puckett's "KISSable OS-9" column in the March *Rainbow* for an excellent example of *PACKing* programs using BASIC09.

Your technical questions are welcomed. Please address them to: Downloads, *the Rainbow*, P.O.Box 209, Prospect, KY 40059. We reserve the right to publish only questions of general interest and to edit for space and clarity.

Design And Development Of Application Software — Part II

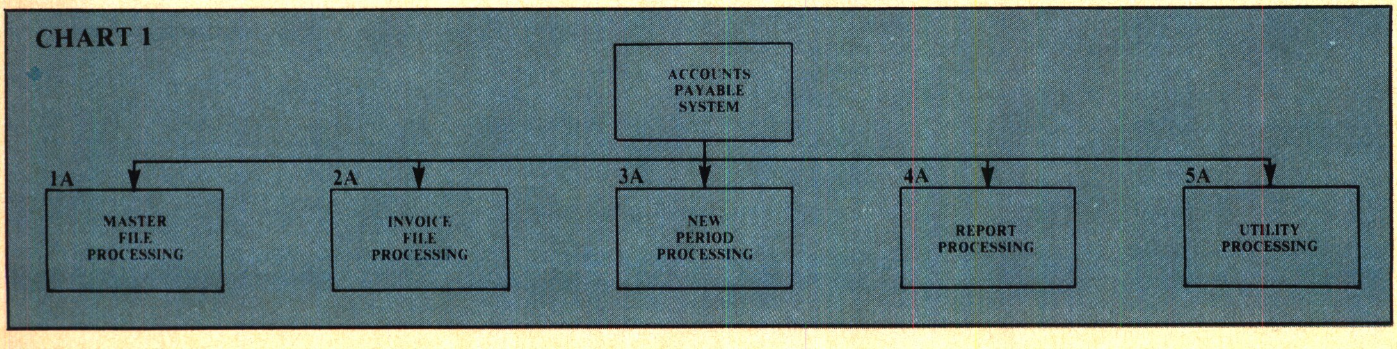
By Paul Searby

In this month's article, we will not only continue our design of an Application, but will delve into theory, and look at some of the tools of development that are often cussed and discussed in the data processing community. Specifically, we will cover the concepts of Top Down Design, Modular Program Design and Structured Programming. Before getting into the new and unknown, let's take a moment to review where we left off last article.

We defined System and Application software, and within Application software, differentiated between the Generalized and Specialized categories. These articles will be dealing with Specialized Applications. Lastly, an overview of design criteria was presented, with maintainability, accountability, ease of use and target system capabilities defined as our criteria.

For many years there have been ongoing debates as to whether

CHART 1


ACCOUNTS PAYABLE SYSTEM
1A
MASTER FILE PROCESSING
2A
INVOICE FILE PROCESSING
3A
NEW PERIOD PROCESSING
4A
REPORT PROCESSING
5A
UTILITY PROCESSING

programming is an *art* or a *science*. Since both categories are taught in our school systems, the fact that you can now get a degree in programming (questionably titled "Computer Science"), does not necessarily resolve the matter in favor of the science proponents. Extensive training does *not* guarantee a great programmer any more than it guarantees a great artist or scientist. In my opinion, inherent talent is the deciding factor, with training providing the tools. IBM has *unsuccessfully* spent many years (and dollars) to prove that this position is wrong: they champion the cause of the egoless programmer.

Okay, now that I've burst the bubble and told you that we're all not going to be "great" programmers, what tools will make us better programmers and program designers? The school of thought that we will draw from is called Top Down Design. Within that, the areas that we will look at include Top Down Program Development, Modular Program Development and Structured Programming.

Top Down Program Development involves writing and testing the highest segments (or modules) of a program first. This is in contrast with the more common method of Bottom Up Development. The Top Down approach has the benefit of giving critical high level modules the most testing, or providing an earlier warning of any interfacing problems, and of forcing you to pay more attention to the overall scope of the project, rather than getting "lost in the trees."

Modular Program Development was mentioned earlier as the use of simple "black box" modules. By this we mean a group of program statements having identifiable boundaries, and only one entry and exit point. A module or segment performs a specific task based on well defined inputs and produces well defined outputs. A module's size is typically kept small, as is its complexity; allowing for easy understanding and maintainability.

Structured Programming is a style of programming in which the structure of a program (the interrelationship of its

"In my opinion, inherent talent is the deciding factor, with training providing the tools."

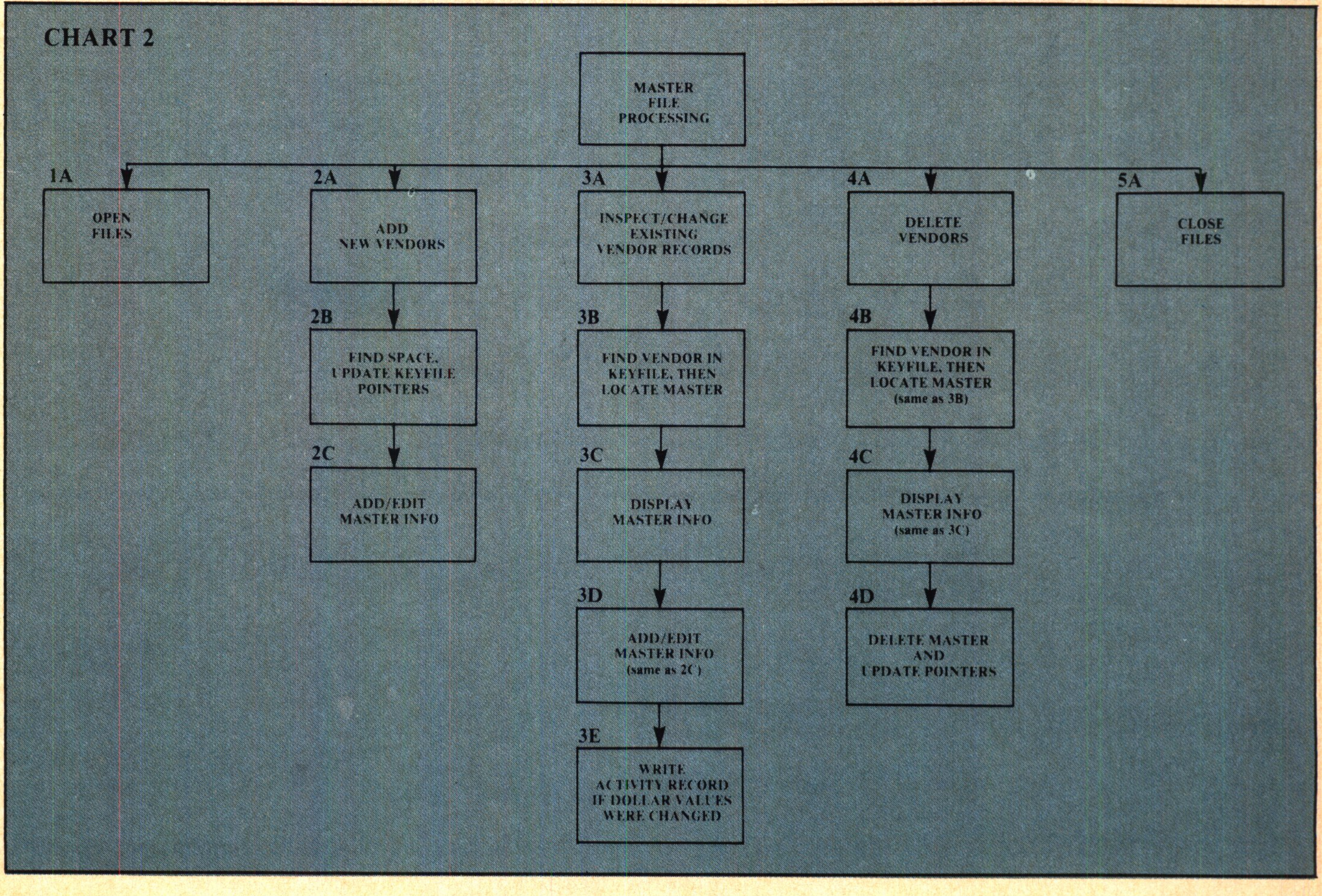


CHART 2

MASTER FILE PROCESSING
1A
OPEN FILES
2A
ADD NEW VENDORS
2B
FIND SPACE, UPDATE KEYFILE POINTERS
2C
ADD/EDIT MASTER INFO
3A
INSPECT/CHANGE EXISTING VENDOR RECORDS
3B
FIND VENDOR IN KEYFILE, THEN LOCATE MASTER
3C
DISPLAY MASTER INFO
3D
ADD/EDIT MASTER INFO (same as 2C)
3E
WRITE ACTIVITY RECORD IF DOLLAR VALUES WERE CHANGED
4A
DELETE VENDORS
4B
FIND VENDOR IN KEYFILE, THEN LOCATE MASTER (same as 3B)
4C
DISPLAY MASTER INFO (same as 3C)
4D
DELETE MASTER AND UPDATE POINTERS
5A
CLOSE FILES

CHART 3

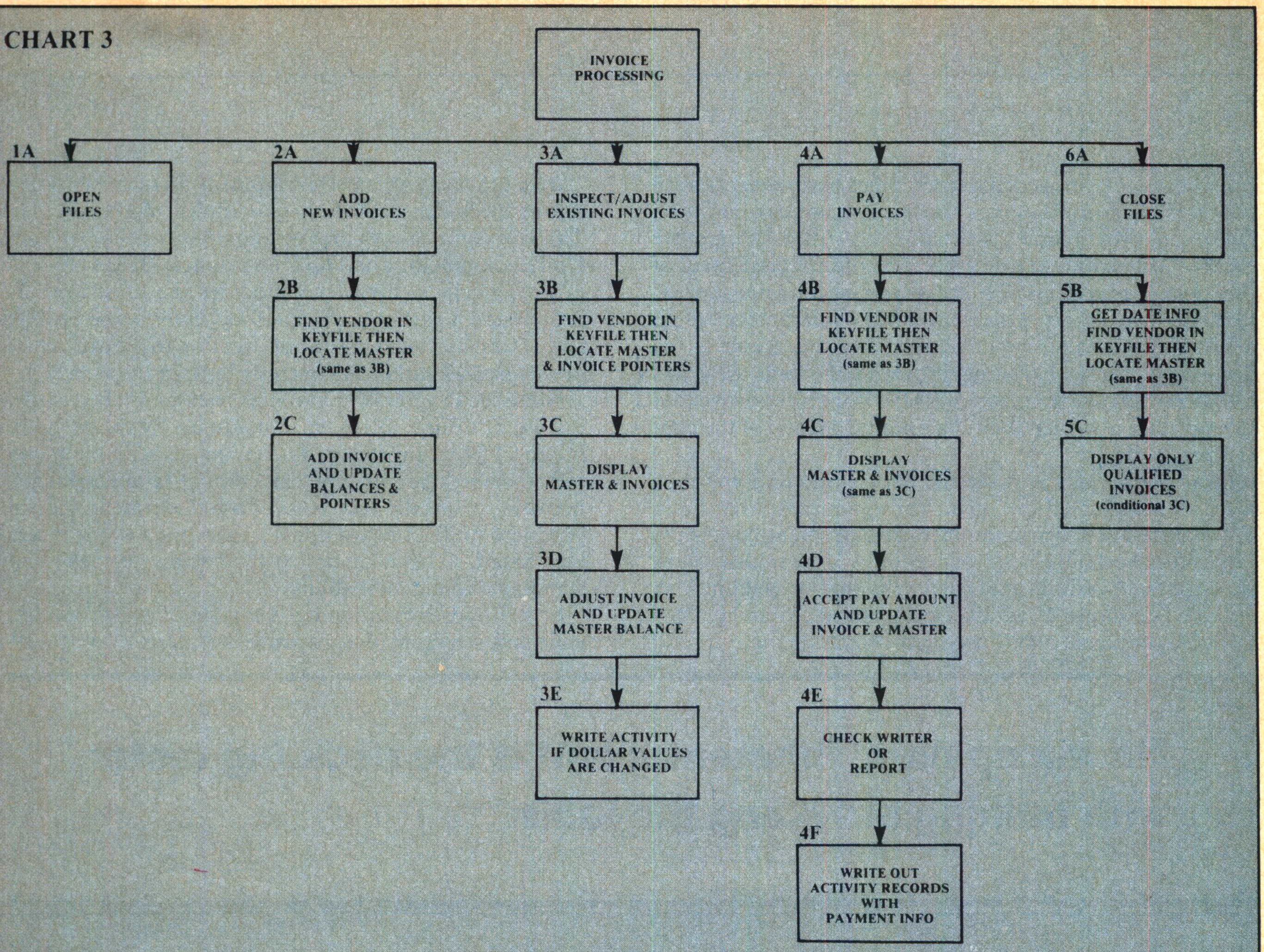
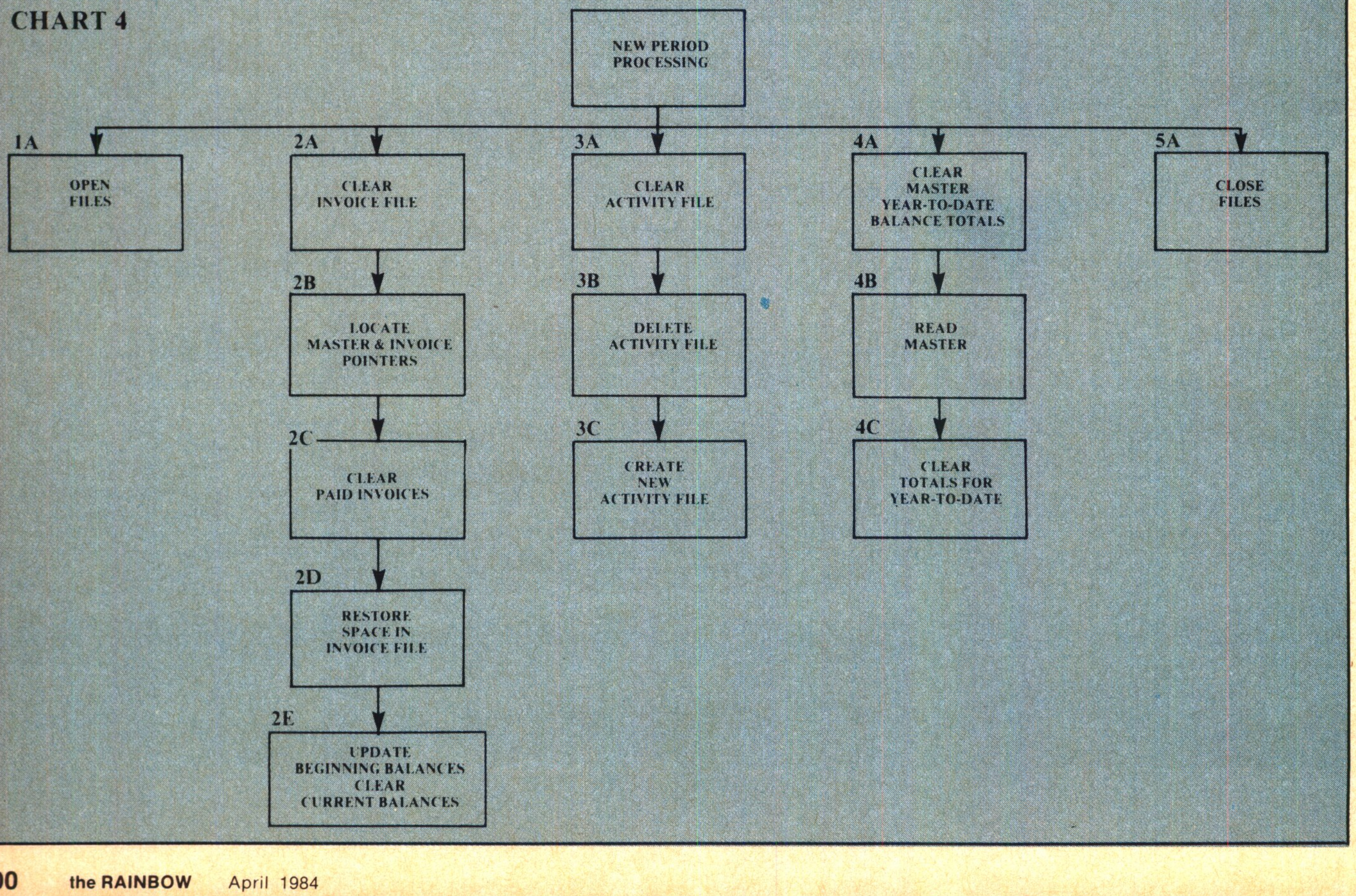

INVOICE PROCESSING
1A
OPEN FILES
2A
ADD NEW INVOICES
2B
FIND VENDOR IN KEYFILE THEN LOCATE MASTER (same as 3B)
2C
ADD INVOICE AND UPDATE BALANCES & POINTERS
3A
INSPECT/ADJUST EXISTING INVOICES
3B
FIND VENDOR IN KEYFILE THEN LOCATE MASTER & INVOICE POINTERS
3C
DISPLAY MASTER & INVOICES
3D
ADJUST INVOICE AND UPDATE MASTER BALANCE
3E
WRITE ACTIVITY IF DOLLAR VALUES ARE CHANGED
4A
PAY INVOICES
4B
FIND VENDOR IN KEYFILE THEN LOCATE MASTER (same as 3B)
4C
DISPLAY MASTER & INVOICES (same as 3C)
4D
ACCEPT PAY AMOUNT AND UPDATE INVOICE & MASTER
4E
CHECK WRITER OR REPORT
4F
WRITE OUT ACTIVITY RECORDS WITH PAYMENT INFO
5B
GET DATE INFO
FIND VENDOR IN KEYFILE THEN LOCATE MASTER (same as 3B)
5C
DISPLAY ONLY QUALIFIED INVOICES (conditional 3C)
6A
CLOSE FILES

CHART 4


NEW PERIOD PROCESSING
1A
OPEN FILES
2A
CLEAR INVOICE FILE
2B
LOCATE MASTER & INVOICE POINTERS
2C
CLEAR PAID INVOICES
2D
RESTORE SPACE IN INVOICE FILE
2E
UPDATE BEGINNING BALANCES CLEAR CURRENT BALANCES
3A
CLEAR ACTIVITY FILE
3B
DELETE ACTIVITY FILE
3C
CREATE NEW ACTIVITY FILE
4A
CLEAR MASTER YEAR-TO-DATE BALANCE TOTALS
4B
READ MASTER
4C
CLEAR TOTALS FOR YEAR-TO-DATE
5A
CLOSE FILES

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parts) is made as clear as possible by restricting control logic to just three structures:

1) Simple SEQUENCE of functions (statements are processed as they appear).
2) SELECTION of functions (*IF. . . THEN. . . ELSE*).
3) Loop control or ITERATION (*DO WHILE* or *FOR . . . NEXT*).

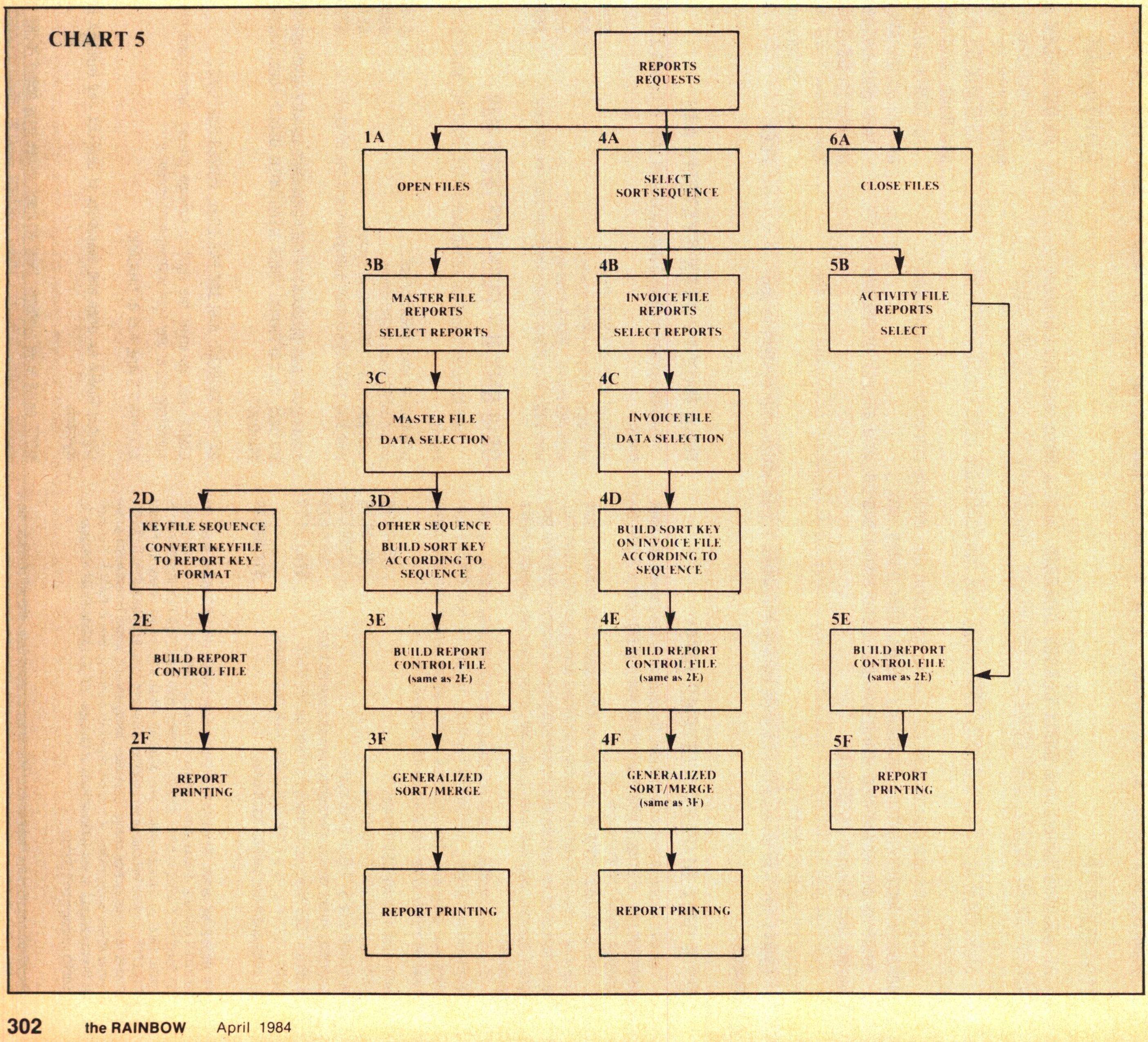
Structured Programming has also been termed *GOTO-less* programming. Since the BASIC language does not lend itself as well to Structured Programming as do other languages such as PASCAL, etc., we will borrow from the philosophy, but not strictly adhere to its program structure.

Would you like the above three paragraphs translated into simple, easy-to-understand English? Here goes: When designing and coding a program, define it from the highest levels down, breaking it into small easy to understand parts, keeping in mind that the easiest way to follow a set of thoughts is the same way we've learned to read — one line after another. Most people's reaction is: sure — that's obvious, but they (myself included) don't always put it into practice.

When I do use Top Down concepts, I honestly get a simpler, more flexible program. Part of the problem in using the technique seems to be that programmers are, in general, overly optimistic and tend to underestimate the scope of a project. So instead of a good design stage, they just dig in and start programming. All too often this can lead to "boxing yourself in" and then having to resort to "a little patch" here and "a little patch" there to get out of the box. These patches increase the complexity and reduce the flexibility of your software. Also, they are not always "little" . . . enough on theory! Let's design something.

Although I can think of several program subjects that would be more interesting from an application point of view, I have chosen Accounts Payable as our example, because from a design and file structure point of view it contains all the "pieces" that I want to use as examples. As we get into the design, you will hopefully begin to look at an application from a slightly different point of view: not as much what the user perceives the application to be, but rather the file structures and their interrelationship to each other. As an example, actually Accounts Payable and Accounts Receivable are basically the same, with the exception that in one case you pay the invoices and in the other, you are tracking receipt of payment of those invoices. Could

CHART 5


REPORTS REQUESTS
1A
OPEN FILES
4A
SELECT SORT SEQUENCE
6A
CLOSE FILES
3B
MASTER FILE REPORTS SELECT REPORTS
4B
INVOICE FILE REPORTS SELECT REPORTS
5B
ACTIVITY FILE REPORTS SELECT
3C
MASTER FILE DATA SELECTION
4C
INVOICE FILE DATA SELECTION
2D
KEYFILE SEQUENCE CONVERT KEYFILE TO REPORT KEY FORMAT
3D
OTHER SEQUENCE BUILD SORT KEY ACCORDING TO SEQUENCE
4D
BUILD SORT KEY ON INVOICE FILE ACCORDING TO SEQUENCE
2E
BUILD REPORT CONTROL FILE
3E
BUILD REPORT CONTROL FILE (same as 2E)
4E
BUILD REPORT CONTROL FILE (same as 2E)
5E
BUILD REPORT CONTROL FILE (same as 2E)
2F
REPORT PRINTING
3F
GENERALIZED SORT/MERGE
4F
GENERALIZED SORT/MERGE (same as 3F)
5F
REPORT PRINTING
REPORT PRINTING
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our Accounts Payable be turned into an Accounts Receivable System at a later date? Yes, only some of the modules dealing with specific logic for a Payables system and minor file definitions need to be rewritten.

This brings up another important reason for investing in the design of your application: not all that often do we start from scratch when we write a program. Typically, programmers borrow from what they have previously written and know works. If we do a good job now, we will most likely save a lot of time in the future. . . .

> **". . . By designing and programming from the top down, it should be easy to add . . . oversights as we go."**

Throughout the pages in this article, you will find six charts. Actually, it is one large chart of our Accounts Payable System, broken up for presentation purposes. Let me say right now that I don't feel that the chart is complete or final, but it shows the first stage of design: a general overview defining the modules and their interrelationships. Although it is good to spend considerable time on your design flowchart, it should not get too specific. Remember, at design time, we want to concentrate on the whole forest. It is inevitable that, as we continue, we will think of items that could have been included. By designing and programming from the top down, it should be easy to add these oversights as we go.

I have divided our system into the five major categories of Master File Processing, Invoice File Processing, New Period Processing, Report Processing, and Utility Processing. Then within each major category, I have further defined the steps necessary to allow the user to look at, update, add or delete their information. Both New Period Processing and Utility Processing contain what are commonly called the "housekeeping functions" and at programming time, may even lend themselves to being combined into one program. To date, the only assumptions that have been made about the computer system which will run these programs is that it will have a disk system and be capable of using Computerware©'s Random BASIC™. Before we actually start programming, we will better define our target computer's capabilities to insure that our programs will be compatible.

One of the purposes of flowcharting out the system in advance is to establish commonality between program modules. Take note that under Master File Processing there are three cases where common modules are referenced. In Invoice Processing, there are again several common modules, and in fact, the module titled "Find Vendor in Keyfile and Locate Master" is common between both Master and Invoice Processing. As you study the flowchart, you will see more areas where a module can be reused. By defining that at the design level, we can insure that when those program modules are written they will retain the ability to be used commonly throughout the system.

This brings to a close "Design and Development of Application Software — Part II." The next article will cover the file structures, their interrelationship, record layouts, and system inputs and reports. Hopefully, this article has shown the importance of organizing and planning your application prior to programming. If you saw a similarity between the flowchart and an outline, you've picked up on the fact that what we basically did was to outline our project prior to beginning our writing (programming). Nothing really new and innovative; probably the hardest part is disciplining oneself to "resist the urge to code."

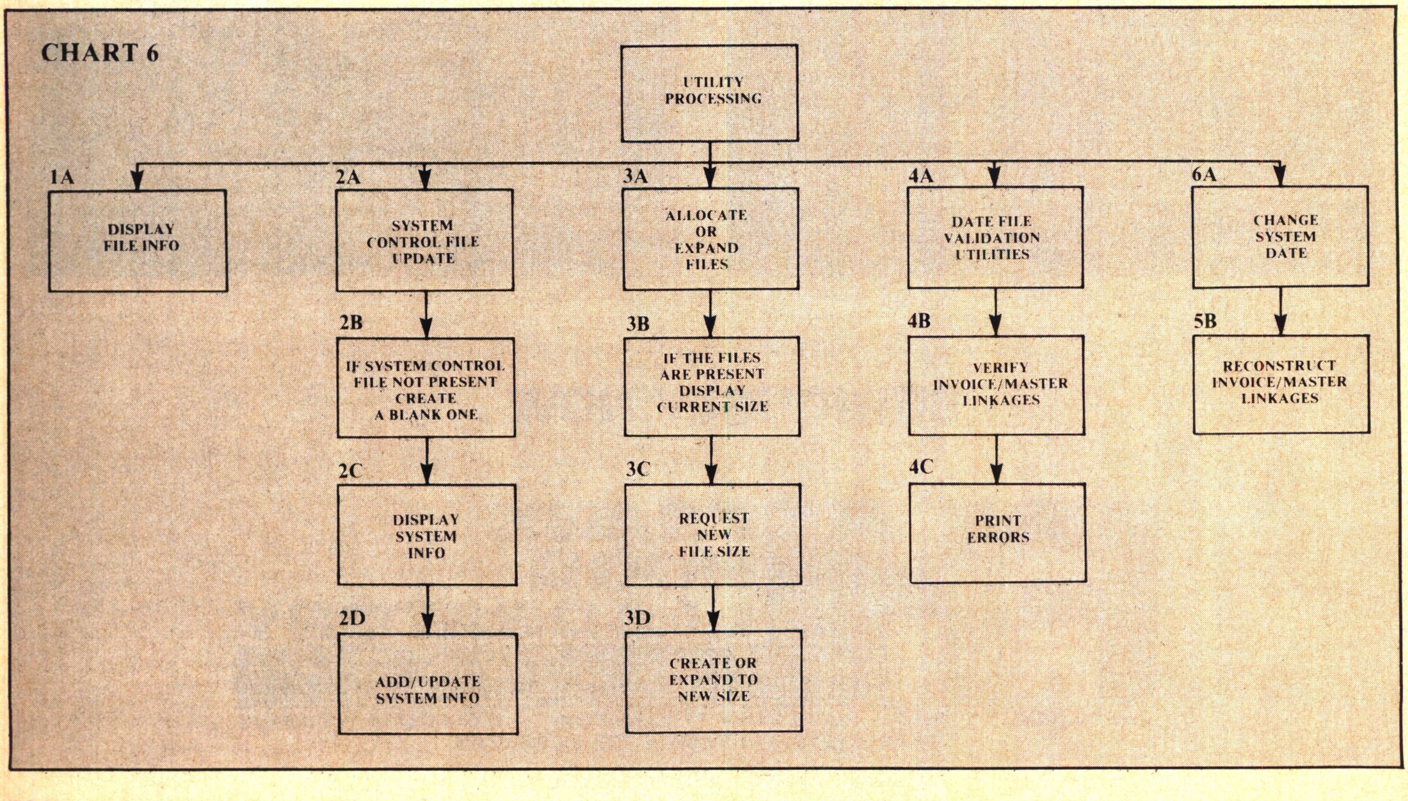
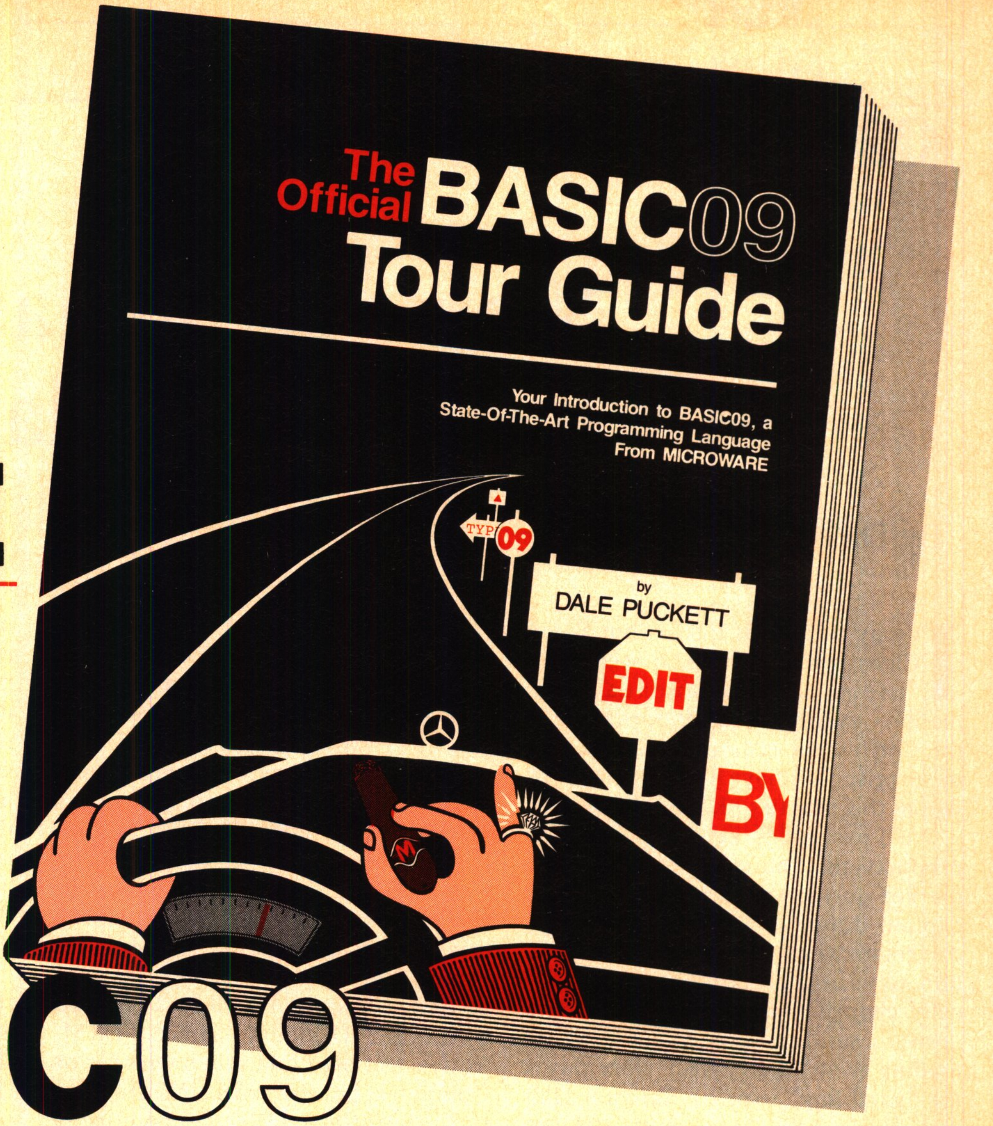


CHART 6
UTILITY PROCESSING
1A
DISPLAY FILE INFO
2A
SYSTEM CONTROL FILE UPDATE
2B
IF SYSTEM CONTROL FILE NOT PRESENT CREATE A BLANK ONE
2C
DISPLAY SYSTEM INFO
2D
ADD/UPDATE SYSTEM INFO
3A
ALLOCATE OR EXPAND FILES
3B
IF THE FILES ARE PRESENT DISPLAY CURRENT SIZE
3C
REQUEST NEW FILE SIZE
3D
CREATE OR EXPAND TO NEW SIZE
4A
DATE FILE VALIDATION UTILITIES
4B
VERIFY INVOICE/MASTER LINKAGES
4C
PRINT ERRORS
6A
CHANGE SYSTEM DATE
5B
RECONSTRUCT INVOICE/MASTER LINKAGES

Get the most out of BASIC09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KISSABLE OS-9

News, Explanations And A Checkbook Balancing Act

By Dale L. Puckett

It may be almost Easter, but Santa Claus is still visiting. It seems like there has been a surprise a day in the mailbox ever since OS-9 appeared on the CoCo scene last fall. And speaking of surprises, we have a few planned for you in this month's "KISSable OS-9."

We'll pass along news about several products that have appeared on the market during the last month, try to explain device descriptors and device drivers and how they work, show you how to write a procedure to automatically change a device descriptor, and answer several questions about memory, loading BASIC09, etc. Also, since this is the "gambling" issue of *Rainbow*, I'm including a copy of a simple BASIC09 Checkbook program. Balancing mine is always a gamble. That's the truth.

Quick Hardware Note

I was just introduced to a new plug-in board that enhances CoCo OS-9 operation. Bill Ball, one of the guys in the carpool, bought a used "WordPak" made by PBJ in North Bergen, N.J. As luck would have it, he got one of the first boards off the line and the hardware was addressed at a different address than the pointer in his OS-9 device descriptor. Needless to say, it didn't work when he tried to run it. When we called, Al at PBJ told us that the company had to move the board so it wouldn't conflict with Tandy's new extension bus. WordPak was on the market first.

PBJ really has its act together when it comes to OS-9. The software that drives WordPak is installed in OS-9 by running a procedure file that replaces two CoCo OS-9 modules. CCIO, the standard CoCo OS-9 keyboard and screen driver is replaced with a device driver named WordPak and the standard Tandy device descriptor TERM is replaced by a new PBJ module named TERM. You just sit back and watch your Color Computer do the work. When your CoCo is finished, OS-9 will boot using WordPak as the main display.

Since you only need to add two new modules to drive this 80-column display, it is fairly easy to keep your original CoCo capability and use WordPak as an alternate display. To do this, you simply leave the original CCIO and TERM modules in memory for normal operation, loading and using the WordPak device driver and matching device descriptor when you want the alternate display device. Both should reside in your execution directory. To load the device driver, you would type:

```
OS9: Load Wordpak [ENTER]
```

Before you may use WordPak as an alternate display, you must first change the name string in PBJ's device descriptor TERM with a disk editor. You'll need to use a disk editor because if you try to load PBJ's TERM from the disk as is, OS-9 will not accept it because Tandy's TERM is already in memory.

You see, OS-9 will only load a module from disk with the same name as a module already in memory when the revision number of the new module is higher than the revision number of the module in memory. I use a stand-alone machine language program called *Disk-Edit* to do the job. It comes in very handy at times like this. However if you don't need a tool like this very often, you can easily type in the source of the BASIC09 program named *Patch* on Page A-13 of the BASIC09 reference manual. It does the same thing.

Here's an easy one-byte swap. Change the "T" to a "V" and call the PBJ display VERM. You will also want to rename the file that holds the modified module. If you name the module VERM, it makes good sense to give the new file the same name.

VTRM might be a better name for your new device descriptor. To give it this name you would need to change the first three characters of the original device descriptor's name string. It would be harder to change the fourth character since the eighth bit is set and you would have to add $80 Hex to the value of the ASCII character you wanted to put in that position.

It would also be difficult for you to give the descriptor a name longer than four characters without access to the source code. If all this talk of changing name strings confuses you at first, stick with us. You'll find a detailed explanation of device descriptors elsewhere in this month's column.

Keep in mind that since you have changed a byte within the module in your new file you must VERIFY it with the update, "u" option before it will load.

Here is an example that shows how you could send the output of OS-9's DUMP utility to the 80-column card

---

(Dale L. Puckett is a free-lance writer and programmer who has worked with the Motorola family of microprocessors since 1976. He just completed his first book, The Official BASIC09 Tour Guide, *this summer. It is being published by Microware and will be available this fall. He is the author of* DynaSpell, Readtest, Esther *and* Help, *which are available from Frank Hogg Laboratories. He serves on the Info World Software Review Board and is a Chief Warrant Officer in the U.S. Coast Guard.)*

after you have renamed and verified the new device descriptor, type:

```
OS9: load VTRM
OS9: dump afile >/VTRM
```

I received excellent support when I asked Al at PBJ about Bill's problem and since then I have noticed several tributes to WordPak and PBJ service on the CompuServe OS-9 SIG. I would like to go on record and request that they add one more file to their package of OS-9 software for WordPak. That would be a device descriptor already named VT or WPak or something similar so that you could use WordPak as an alternate display without making your own descriptor.

Now, About The Null Modem Cable

Sometimes, good things come out of typesetting errors. Several weeks ago, before I had received my copy of the February *Rainbow* a UPS truck pulled up and the driver dropped off a package from Bob Rosen at Spectrum Projects in Woodhaven, N.Y.

"I also have received many calls asking about hooking an external terminal to CoCo's RS-232 connector," Bob wrote. "My company now sells two OS-9 null modem cables. The first lets you hook up a CoCo or MC-10 as a second terminal. The second will let you connect a Model I, II, III, 12, 16 or 100 as an external terminal."

This cable is the easy way to hook another terminal or another CoCo up to the RS-232 connector. I say this because a number of people that have written us at *Rainbow* seem to be having trouble making their own cable. Besides, if you are busy, you have to add the value of your time before you start piddling. I tried Bob's cable with the Televideo 925 and it worked great.

Rosen said that he has a customer who claims to have a patch that lets him run OS-9 with an external terminal at 1200 Baud. If Bob can talk his friend into sending us the information for the patch we'll publish it here. If not, contact Bob at: (212) 441-2807.

While we're on the subject of a 1200 Baud patch, James Johnson of Hampton, Va., wrote to tell us about a friend who had also solved the problem. He says there is an error in the device drivers. Jim credits Maurice Riggins, 9 Floyd, Poquoson, Va., 23668 with finding the problem. We'll see if we can get Maurice to send us the information.

When *Rainbow* finally arrived, I realized what stirred up all the interest. In a paragraph about terminal problems, the following line appeared: "Hopefully the new RS-232 cord that is designed to plug in the new expander interface contains a real ACIA. The word "card" had been translated to "cord."

Speaking of that card, I've learned from John Adams in Montrose, Mich., that the Radio Shack serial card does contain an ACIA — one of the new 6551s. Adams is working on an OS-9 device driver for the card now and hopefully he will share it with us.

The OS-9 Philosophy In Action
Or, Dan Johnson Strikes Back

OS-9 is a perfect example of the effectiveness of modular programming — or at least it was until Tandy put it on the Color Computer. On the older, standard OS-9 systems you could add new hardware — additional disk drives, graphics display boards or mechanical plotters, for example — with ease.

> "Would you believe, 1440 sectors on a single disk?"

Suppose that you own 35-track, single-sided, single-density disk drives and are struggling along doing the best you can. Then, your day comes and you win the *Readers Digest* Sweepstakes. **Or, maybe you hit the daily double at the track. In any case you'll probably want to move up to double-sided, double-density drives right away.**

On a standard OS-9 system, you need only plug in the new drive and change one or two bytes in an OS-9 device descriptor. The change is so simple that you can make it quickly with the OS-9 debug utility.

Not so on the CoCo version of OS-9. Tandy chose to hard code the description of the standard Radio Shack 35-track, single-sided, double-density drive into the device driver, CCDISK, instead of having the driver read the description from a device descriptor — the standard OS-9 way.

Why are we beating this drum again? Because, now there is a solution to the problem. Dan Johnson of D. P. Johnson in Portland, Ore., has written a new device driver called SDISK which replaces the Tandy driver, CCDISK. Once you have installed this device driver, you can read and write 35-, 40- or 80-track drives. And better yet, those drives can be single or double density, as well as single or double sided.

SDISK also lets you program the disk drive step rate. And it gives you a way to read a disk written by a standard OS-9 system like the GIMIX or Smoke Signal. Needless to say, it also lets you write a disk that can be read by the larger systems.

I received SDISK yesterday and installed it immediately. It took about 20 minutes following the step-by-step directions in the manual.

And what did I gain by the effort? Would you believe, 1440 sectors on a single disk. A standard OS-9 disk on the GIMIX contains 1274 sectors on the same disk. That should make you proud of your CoCo. The extra space is made possible because Tandy's double density format puts 18 sectors on each track. The standard OS-9 system only uses 16 sectors on a track.

How Many Drives Do You Need?

Speaking of disk drives. It's time to take a stand. I say that because of several letters I have received during the past month. Cletus Piper of East Alton, Ill., put it best:

> "Now that I have OS-9 and BASIC09, it seems that some discrepancy exists between what I have read, and what I am experiencing. Here's the major question. Exactly how many disks does it take to use OS-9? Every article I have read has said that OS-9 was designed to operate on a single disk system. In fact, I purchased my disk drives based on this information. Now I find that when I put BASIC09 on my system disk I only have about 4K of disk space remaining."

I don't remember writing that OS-9 was "designed" for a single disk system. In fact, I can't imagine anyone that has used OS-9 long saying that. Although OS-9 is not as disk intensive as Unix, it does use the disk drives a lot. And, its modular approach lets you get a lot of work done with a small amount of memory.

There is no question about it, operation with one drive is a big hassle. Yet, no more so than with FLEX, or MSDOS and CP/M for that matter. In fact, since you can load modules into any location in memory, operating with one drive is much easier with OS-9 than it is with many of the other operating systems.

Here's the best advice I can give you — use two drives if at all possible. And, if you haven't added that second drive, or if you haven't bought your drives yet — consider getting something besides the standard Radio Shack 35-track, single-sided, double density drive. Dan Johnson states the argument:

> "There are several advantages. First, most other 48 TPI drives have 40 tracks instead of 35, giving you more storage; and most use step rates faster than the 30 millisecond step rate used by Radio Shack, giving you faster and quieter system operation."

Johnson also noted that if you have a serious job to do with your computer, you should buy two drives. I agree. Remember, you can copy a file or backup a disk much faster with two drives than you can with one. And if you really need a lot of storage on-line, you can buy an 80-track model which packs 96 tracks on every inch of the disk.

We also received a filter kit and a hacker's kit from D.P. Johnson this week. These utilities are Unix like and further extend the toolbox concept we introduced several months ago. They are all used with pipes or with standard input and output redirection. We'll take a closer look at them next month.

Loading BASIC09

We received almost a dozen letters during the last month from people who couldn't load BASIC09 into their CoCo or couldn't make it fit on the system disk. Here is a sample letter from Fernand Barbeau up in Canada.

> Problem: On Page 2-3 they write:
> OS9:BASIC09 (does not work)
> I tried:
> OS9: /do/BASIC09 (it reported memory full)

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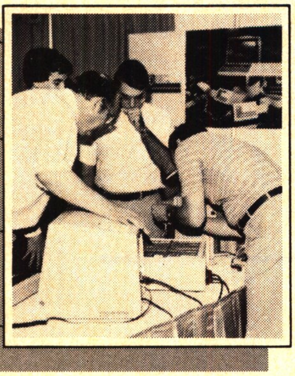

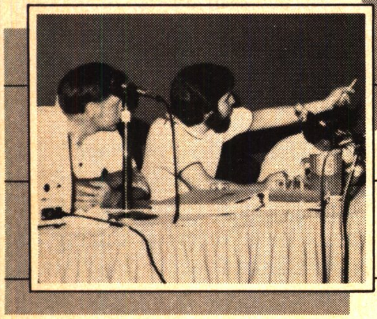

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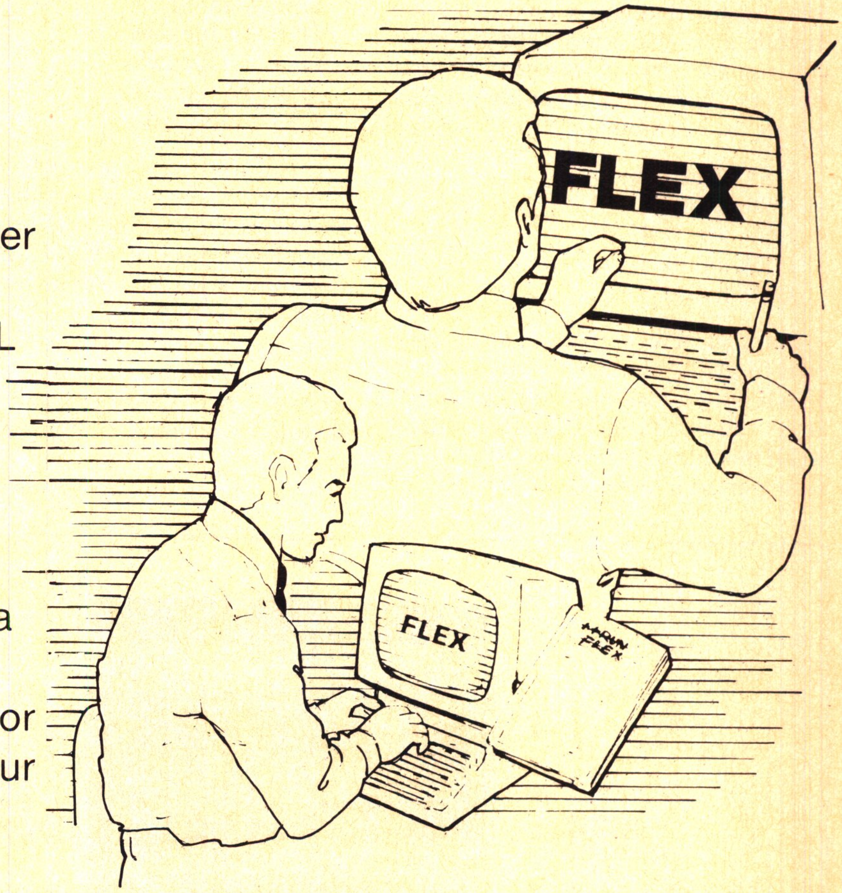

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> So, I tried:
> OS9: /d1/BASIC09 (it reported memory full)
> If I load BASIC09, all is okay. What can I do?

BASIC09 is a large program. The memory available while running OS-9 is limited. This lack of memory is compounded by the fact that Radio Shack's disk drives only hold a little more than 600 sectors of data. Let's discuss memory first.

When you are running OS-9 you must be sure that you unlink a program module after you run it. If you don't, you run the risk of fragmenting your memory. For example, study the following list of commands:

```
OS9: load asm
OS9: load dir
OS9: asm testfile
OS9: unlink asm
OS9: mdir e
```

Look closely at the memory map printed by the module directory utility. You'll notice that you have two rather large chunks of memory free with a small module a few hundred bytes long sitting in the middle. You may have 120 pages of memory free, but it is split into two pieces around 50 pages long.

BASIC09 is more than 23,000 long. That's more than 90 pages. Since OS-9 Level I requires that all program modules be loaded into contiguous memory, that means you won't be able to load BASIC09 into memory once your memory becomes fragmented.

What's the answer? There are two. First, you can be careful and make sure you unlink a module when you are through with it. For example:

```
OS9: load list
OS9: list file.one
OS9: list file.two
OS9: list file.three
OS9: unlink list
```

The other alternative is not to load a utility command module at all, just call it from the OS-9 command line. This is possible because of OS-9's automatic operation. Do you remember how the system works?

When you type a name following the OS9: prompt, the system looks for it in a directory that holds the name of all modules in memory. If it finds it there, it will fork to it and execute your command.

If the module is not in memory, it doesn't give up. Rather, it searches the directory of your current execution directory for a file by that name. If it finds it, it loads the module contained in the file into memory and executes it.

And, if it still doesn't find your file it still won't quit. It makes one more try and searches your current data directory for a file with the name you typed on the command line. If it finds it, it considers it a procedure file and attempts to execute the commands contained in the file. Now that's stamina.

Here are the alternate command lines:

```
OS9: list file.one
OS9: list file.two
OS9: list file.three
```

Of course, there are performance tradeoffs. If you use the second list of commands, OS-9 will need to go out to your current execution directory and load the utility "list" each time you ask to list a file. In the example above, you will hear the drives load "list" three times. In the first example, they only had to load it once.

With a short utility file like "list" it probably doesn't matter. But what if the file is long, like ASM or BASIC09? You'll need to make your own decision.

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And What About The Disk Space Problem?

Now that we've highlighted the most common cause of the dreaded "Error #207," let's move on to the problem of disk space.

As you have probably discovered by now, it doesn't take long to fill up the 620 sectors available on the Radio Shack single-sided, double density drives. Yet, there are several ways to tackle the problem.

Here's the way I approached the problem when I owned single-sided, single density drives several years ago. Believe it or not, I got organized.

First, I used two drives. The first drive was the system drive. The second was the work drive. I used the first drive to hold command files. I used the second to hold text files or data.

I had one system disk and used it when I was working on programs. It contained my editor, an assembler, a debugger a BASIC interpreter and several small utilities that I needed all the time. Programs like *dir* and *list* were included in the latter category.

I used another system disk for word processing. It held an editor and a text formatter plus several handy word processing utilties. The most used commands like *dir* and *list* were put on this disk also in addition to other small programs that counted words, checked readability, etc.

On the work drive, I used different disks for each type of work. One disk held only BASIC, another magazine articles, and yet another held college homework. It took a lot of disks but I always had enough room on the disk to get the job done.

Let's get back to OS-9 and see how this philosophy applies. Here's one way to implement this strategy. Write protect your original system disk. Then use backup to copy it to a freshly formatted disk. Now, let's change this generic system disk to a BASIC09 system disk.

First, print a listing of the programs in the CMDS directory. Then, stop and consider how often you would use them while running BASIC09. For example, while running BASIC09 you will never need many of the utilities. Look at all the long programs you can delete. The list includes *asm, backup, cmp, cobbler, debug, deldir, edit, format, ident, os9gen,* shell to name a few. These command lines should do the job.

```
OC9: load del
OS9: del asm backup cmp cobbler debug
OS9: del format ident pwd pxd
OS9: del os9gen shell verify
OS9: unlink del
```

You'll need *copy, date, del, deldir, dir, display, echo, free, link, list, load, mdir, mfree, rename, save, tmode, and unlink*, so leave them on the disk.

Since you're making a BASIC09 system disk and won't be using it to do any assembly language programming, you can delete the DEFS directory which contains source code for all the system equates. This will free up a lot of space. To accomplish this run this command.

```
OS9: deldir DEFS
```

Answer the prompt that appears with a "y" for yes and in a few minutes the job will be done.

> "Put the utilities that you use all the time into your boot file."

Another Approach

On a Level I OS-9 system such as CoCo there is another thing you can do to free up some disk space and speed up the operation at the same time. Put the utilities that you use all the time into your boot file. Once this is done you won't need them in your working system directory. For example, if you use *dir, del, list, mdir, mfree*and *echo* often, why not put them in your boot file.

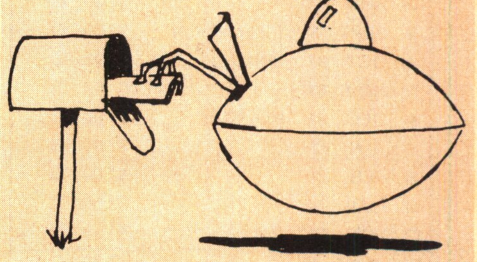
First, build a list of the modules you want to be in this boot file into a file called boot list. Save it on drive /do. Then, RUN *os9gens*. This sequence shold do the job.

```
OS9: build /d0/bootlist
? /d0/os9boot
? /d0/cmds/dir
? /d0/cmds/del
? /d0/cmds/list
? /d0/cmds/mdir
? /d0/cmds/mfree
? /d0/cmds/echo
? [ENTER]
```

Next, you must format the disk that you intend to put your new BASIC09 system directory on.

```
OS9: format /d1
```

Now, load the often used files above



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so that they will be in memory when you RUN *os9gen*.

```
OS9: load load
OS9: load dir
OS9: load del
OS9: load list
OS9: load mdir
OS9: load mfree
OS9: load echo
OS9: unlink load
```

The modules you want to add to your bootfile are now in memory so you can go ahead and RUN *os9gen*.

```
OS9: os9gen /d1 </d0/bootlist
```

This command line will place a new *os9boot* file on the freshly formatted disk on drive /d1. It will load the files listed in the file /d0/bootlist that you have just made. It gets the list of names from this file instead of from the terminal because you redirected the input to come from the file.

> "The cost of using this approach is billed in memory. The payoff is in speed."

After you have made the disk with the new boot file, you can copy all the files from your present system disk to the new one with this sequence of commands.

```
OS9: chd /d0
OS9: dsave -s 12K /d0 ! (-x chd /d1)
```

The cost of using this approach is billed in memory. The payoff is in speed. Name your poison. But remember, once these commands have been installed in the boot file, they are as good as in ROM (Read Only Memory) and you'll never need them in your working execution directory.

In fact, if you stop and think about it a moment you could create several different boot disks. One could come up with BASIC09 in memory and many packed BASIC09 intermediate code modules in the execution directory. Another could come up with a word processor like *DynaStar* in memory and a number of word counting and file handling utilities in the execution directory. Go to it. This system can be set up just about anyway you want it.

Typo Alert

One of our readers tried to assemble two of the sample assembly language programs in the *OS-9 Program Development* book — the orange one — and ran into trouble. It seems there are a few more typesetting errors here. Let's look at the listing for "UpDn" on Page 130 first. The first problem is in line number 0033. The book has this instruction:

```
ldy ##01 number of characters
```

It should read:

```
ldy #1 number of characters
```

Actually, you could also have used #01, or #$1. They would all give you the same value in the 6809's Y-register.

Now let's look at line number 003E. The listing tells you to:

```
cmpb WRBND test char bound
```

It should be:

```
cmpb LWRBND test char bound
```

You'll find the label LWRBND on Page 130. The label WRBND does not exist. Good luck, sports fans.

We also found problems in the listing of the device descriptor, p, on Page 132. It won't assemble if you type it in as listed. Why? Let's take a close look.

If you had magic powers and could look at the original listing — before it was assembled you would have seen this code.

```
nam p
ifp1
use /d0/defs/os9defs
endc
```

In the assembled listing it comes out:

```
nam p
ifp1
endc
```

The assembler does not print *use* statement in the middle of the conditional because the condition is not true on the assembler's second pass when the listing is done. The moral of the story, always use the first statement above in your assembly code.

Random BASIC Arrives

We've received a copy of *Random BASIC* for OS-9 from Computerware in Encinitas, Calif. This BASIC interpreter has been around for years on the SS-50 bus machines and is popular with Color Computer FLEX users. It gives you a way to run programs you have written under the FLEX version on OS-9 after you transfer the files over with a utility like XCOPY in *O-PAK*.

All OS-9 commands can be accessed from *Random BASIC* and it gives you nine- or 11-digit precision BCD arithmetic. We'll take a closer look at this package in the near future.

About Loading Other BASIC PROGRAMS INTO BASIC09

There are several things you should be aware of when you attempt to run some of your old BASIC programs under OS-9. The line below must appear as the very first line in every BASIC09 program. This means you must use a text editor to add it before you attempt to load the program into BASIC09. Also, BASIC09 will not accept your program if there are any blank lines before the line below. Here is the magic line:

```
PROCEDURE programname
```

About the only changes I needed to make when running a program from Technical Systems Corporation's (TSC) *Xbasic* on BASIC09 have been needed because the two languages use a different character to separate more than one command on a line. *Xbasic* uses a colon, :. BASIC09 uses a backslash, \. One global edit takes care of this problem. Depending on the code, you sometimes need a few subtle changes, but nothing too serious.

Automatic Procedures

Here's a way you could let your OS-9 system change your system to a faster stepping rate automatically during staryup. First, put this line into your startup file.

```
debug </d0/changedisks
```

This command line will load the debugger from your system directory and execute it. Instead of getting its commands from you on the keyboard however, debug will gets its commands from a file named "changedisks."

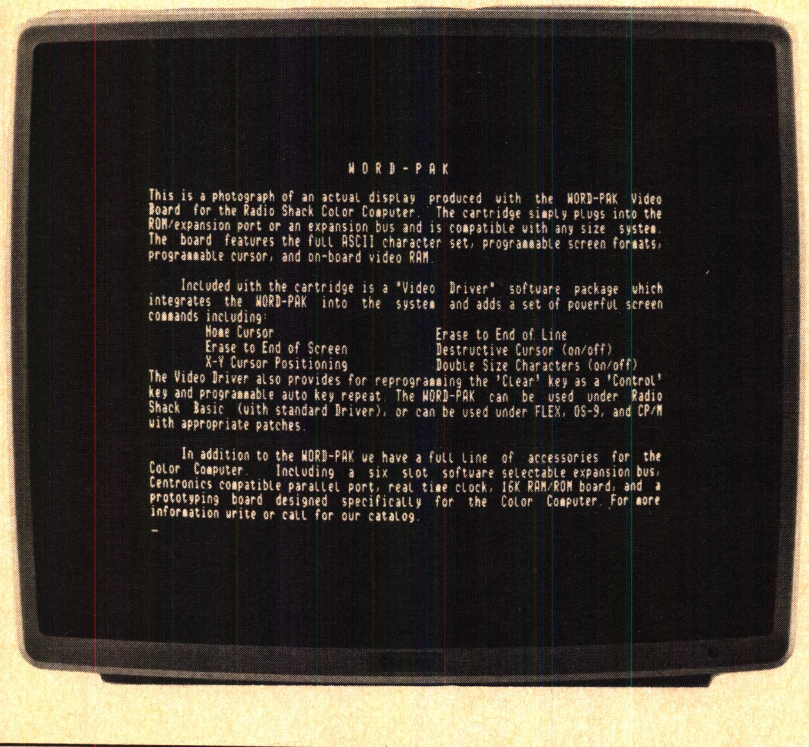
In this listing we used the values for 20 millisecond stepping rates since most Radio Shack drives will step at that speed and everyone can use it. You could just as easily use the values we listed in the March column of "KISS-able OS-9" for 12 or six millisecond step rates if your drives can handle them.

You could also extend the listing to include debugger commands which would change the second side of a double sided drive /d0 to device /d2. Those values were also listed last month. Here's the listing.

```
$load echo
$echo changing step rate in CCDISK
$echo to 20 milliseconds.
l ccdisk
. <SPACE> .+1fe
=12
l ccdisk
. <SPACE> .+204
=08
=8b
l ccdisk
. <SPACE> .+2dd
=42
l ccdisk
. <SPACE> .+2e9
=02
$echo stepping rate has been changed
$unlink echo
q
```

You could even let the debugger tell OS-9 that your drives have 40 tracks instead of 35. To do that you would just add a little more code to the file changedisks.

A PICTURE IS WORTH . . .



```
                         W O R D - P A K

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Of course, it would also be possible to have separate debug command files to change the step rate, change the device number and change the number of tracks. Perhaps you could call them changestep, changedevnum and changetracks.

To change all three you could include the name of a procedure file in your startup file. That procedure file would contain five lines:

```
load debug
debug </d0/changestep
debug </d0/changedevnum
debug </d0/changetracks
unlink debug
```

If you only wanted to make the changes part of the time, you could leave the procedure file above out of the startup file and call it from the OS-9 command line when you wanted to make the changes.

> "To change all three you could include the name of a procedure file in your startup file."

Stretching the imagination a bit further, you could use the listing above to make the changes permanently and install them in a boot file. The procedure file which would do the job would look like this:

```
debug </d0/changedisks
cobbler /d1
verify /d1/os9boot /d1/boot.temp
u
del /d1/os9boot
copy /d1/boot.temp /d1/os9boot
echo disk in drive /d1 now has
echo new CCDISK module that
echo will step at 20 milliseconds.
unlink echo
```

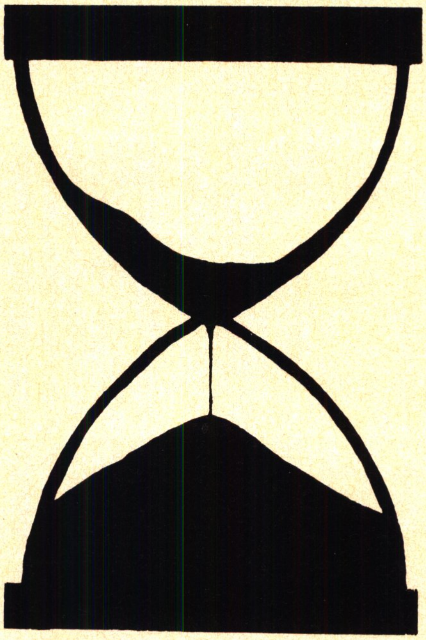
Before you ran this procedure file you would need to make a freshly formatted disk and install it in drive /d1. You would also need to have your original or a backup of your system disk in drive /d0. And the file /d0/changedisks would have to be present on the drive in /d0.

```
PROCEDURE Checkbook
 0000      (* Something to Help balance your checkbook *)
 002E
 002F      DIM answer.clearcode:STRING[1]
 003F      DIM balance.service_charges:REAL
 004A      DIM total_checks,outstanding_deposits:REAL
 0055      DIM number_of_checks,number_of_deposits:INTEGER
 0060
 0061      clearcode:=CHR$($1A)
 006A
 006B      PRINT clearcode
 0070
 0071      PRINT
 0073      INPUT "What was the balance on the statement? ",balance
 00A2      INPUT "What was the total of all service charges? ",service_charges
 00D5
 00D6      PRINT clearcode
 00DB
 00DC      number_of_checks:=-1
 00E4      total_checks:=0
 00EC      amount:=0
 00F4
 00F5      RUN getchecks(number_of_checks,total_checks,amount)
 0109
 010A      PRINT clearcode
 010F
 0110      number_of_deposits:=-1
 0118      outstanding_deposits:=0
 0120      amount:=0
 0128
 0129      RUN getdeposits(number_of_deposits,outstanding_deposits,amount

            )
 013D
 013E      PRINT clearcode
 0143
 0144      PRINT
 0146      PRINT "Your final balance should be  $";
 016A      PRINT USING "R8.2^",balance+outstanding_deposits-(total_checks

            +service_charges)
 0184      PRINT  \ PRINT  \ PRINT
 018A      PRINT "From your statement: "
 01A3      PRINT
 01A5      PRINT "A balance of  $";
 01B9      PRINT USING "R8.2^",balance;
 01C8      PRINT "minus a service charge of  $";
 01E9      PRINT USING "r9.2^",service_charges;
 01F8      PRINT " =  $";
 0202      PRINT USING "r8.2^",balance-service_charges
 0214      PRINT
 0216      PRINT "You had "; number_of_checks; " outstanding check(s), totalling  $"
```

TIME IS RUNNING OUT !



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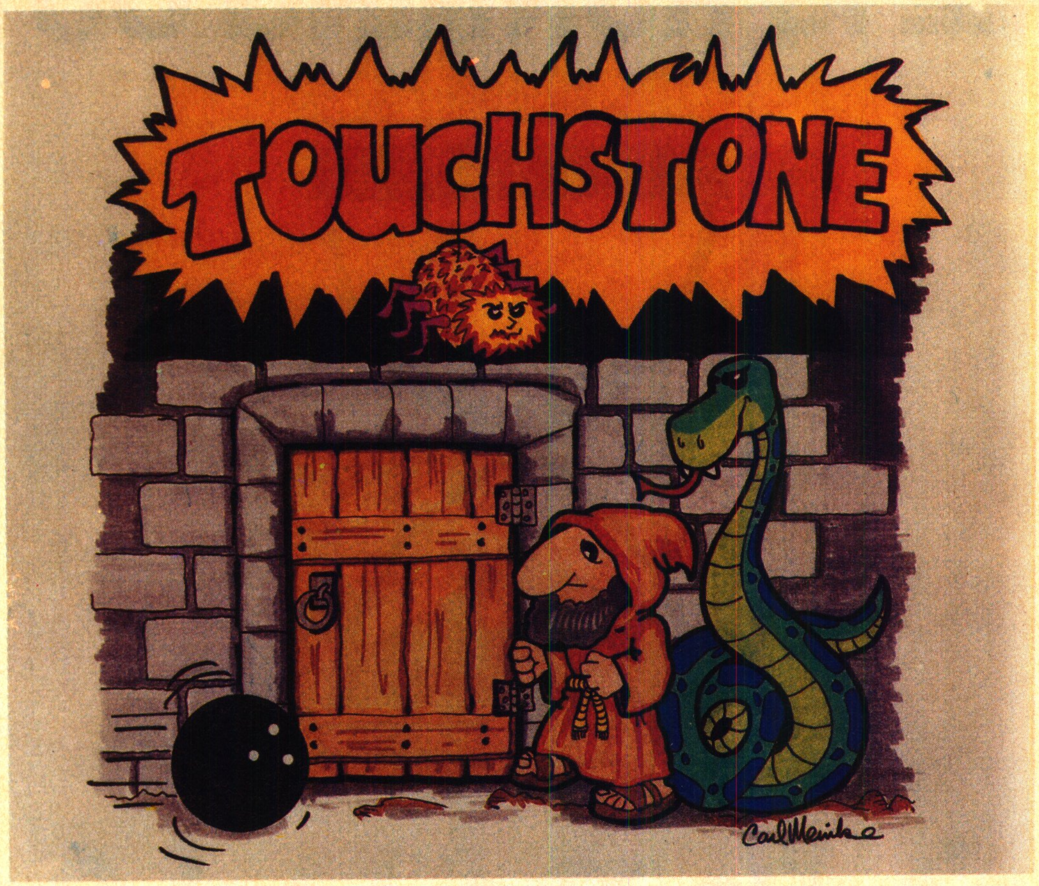

A touchstone is a test to determine the genuineness of something or of someone.

"The Touchstone" is a machine language game that runs on a 32K Radio Shack Color Computer, or any compatible hardware. Joysticks are required for play, 1 or 2 players.

You are one of many priests of Ra who has accepted the challenge of the touchstone. The challenge is a way for any of Ra's followers to become a favored high priest.

For the short time you will be in his temple, Ra will grant you limited use of his powers to help you on your challenge. As you will find, a ray of light shoots from your eyes that kills anything in your path. Also, Ra will give you a lamp filled with an elixor which when spilt, causes your enemies to freeze.

At daybreak, as you enter the temple, you hear Ra's voice reminding you of what you know so well: if you can get to the touchstone you will be highly favored. Further, he warns you that your now working powers are only temporary, and that you must be successful in the mazes to be granted more time. You enter, ready for anything. . . .

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I hope we have expanded your imagination and introduced you to a few new tricks you can use with OS-9. Good luck and if you live in the New York, Philadelphia, Washington area, we'll look for you at the *RAINBOWfest*.

OS-9 Users Group President's Column

Who Are We And What Are We Doing For You?

We are a Des Moines, Iowa, based corporation formed to promote the use of computers in general and Microware's OS-9 operating system in particular. This year's officers were elected at the Second Annual Microware OS-9 Seminar during August 1983. They were given a mandate to incorporate the group, establish a method of communication and set up a software exchange. Progress is being made in all areas. However, to mimic an old saying, four officers do not a dynamic group make.

What Can You Do For Us?

You, the OS-9 user, are the lifeblood of the group. If you take an active part in the organization by contributing programs to the software exchanges, articles for the newsletter and technical help for the newcomers, we will someday be a viable force in the industry. If you do nothing, you will get nothing in return. It's up to you.

We need engineers and systems programmers to help George get the bulletin board system on line. We need recruiters and personnel types to help Peter increase the membership. We need people to help Dave Gibson put out the newsletter. We need people to manage the software library. We need others to write articles and stir up publicity. And we need people to coordinate the exchange of information between the many local OS-9 users groups we hope to inspire.

Why Should We Care?

The 6809 microprocessor — the best on the market — has run behind all others in the personal computing field since the beginning because there has been no coordination and cooperation. With the increase in the number of users made possible by Tandy's Color Computer version of OS-9, we again have a chance to become a viable force in the marketplace.

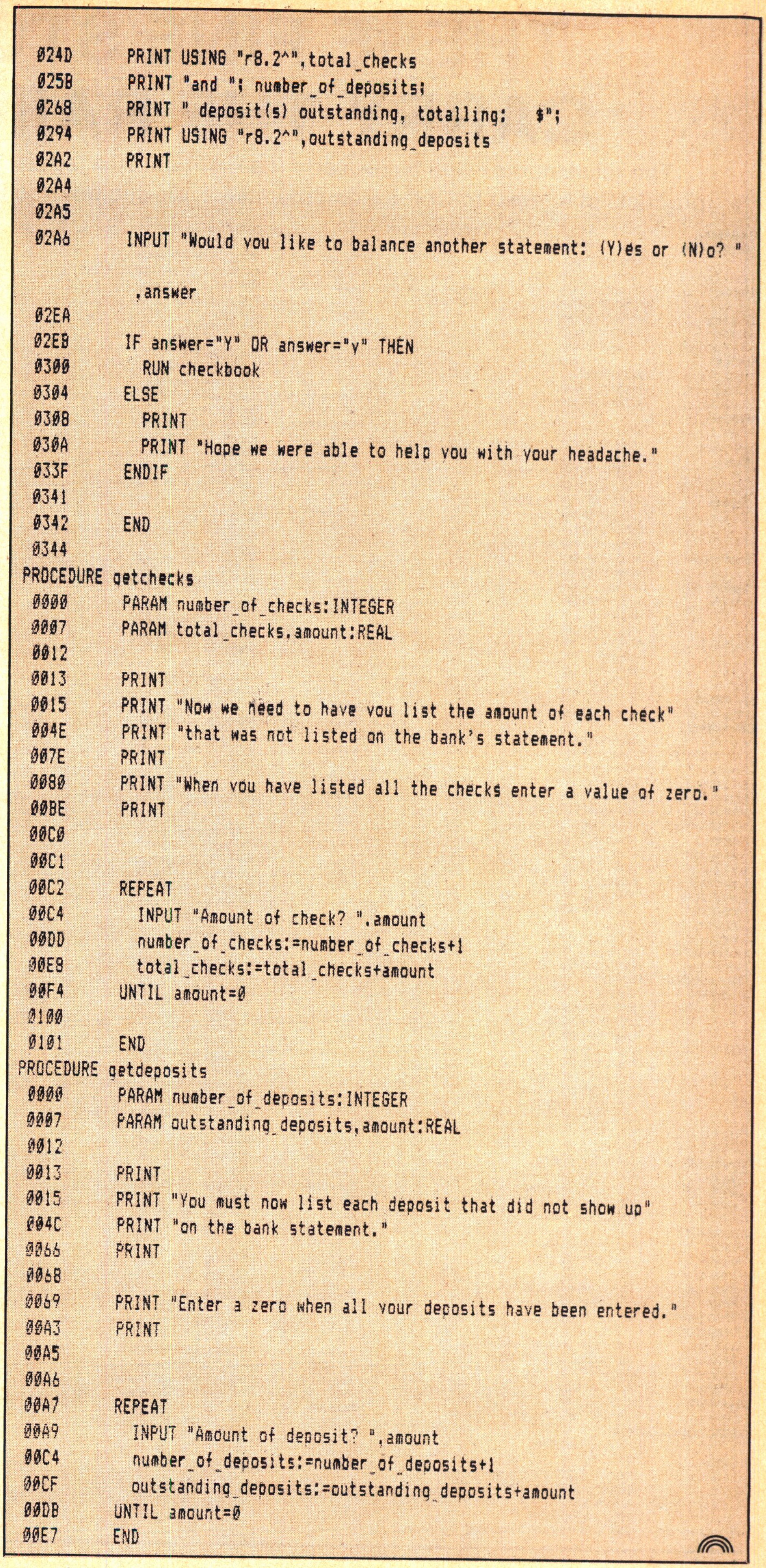
Please, say you want to help. Send us a letter and tell us what you would like to do. We'll put you in touch with the proper committee chairman immediately. And remember, if you solve a problem or create something you're proud of, send it to us for publication in *MOTD* and leave a note on the CompuServe OS-9 SIG.

Membership News

Your membership will be good through January 1, 1985. Renewals at or after the Third Annual OS-9 Seminar in August 1984, will be good from then through December 31, 1985. All members, regardless of when they join, will receive all services of the Users Group provided since August 1983. Additionally, all OS-9 Users Group members will have access to the special CompuServe XA-4 database which contains our complete software exchange library.

We hope you'll join us.

— Dale L. Puckett



```
 024D      PRINT USING "r8.2^",total_checks
 025B      PRINT "and "; number_of_deposits;
 0268      PRINT " deposit(s) outstanding, totalling:   $";
 0294      PRINT USING "r8.2^",outstanding_deposits
 02A2      PRINT
 02A4
 02A5
 02A6      INPUT "Would you like to balance another statement: (Y)es or (N)o? "

            ,answer
 02EA
 02EB      IF answer="Y" OR answer="y" THEN
 0300        RUN checkbook
 0304      ELSE
 0308        PRINT
 030A        PRINT "Hope we were able to help you with your headache."
 033F      ENDIF
 0341
 0342      END
 0344
PROCEDURE getchecks
 0000      PARAM number_of_checks:INTEGER
 0007      PARAM total_checks,amount:REAL
 0012
 0013      PRINT
 0015      PRINT "Now we need to have you list the amount of each check"
 004E      PRINT "that was not listed on the bank's statement."
 007E      PRINT
 0080      PRINT "When you have listed all the checks enter a value of zero."
 00BE      PRINT
 00C0
 00C1
 00C2      REPEAT
 00C4        INPUT "Amount of check? ",amount
 00DD        number_of_checks:=number_of_checks+1
 00E8        total_checks:=total_checks+amount
 00F4      UNTIL amount=0
 0100
 0101      END
PROCEDURE getdeposits
 0000      PARAM number_of_deposits:INTEGER
 0007      PARAM outstanding_deposits,amount:REAL
 0012
 0013      PRINT
 0015      PRINT "You must now list each deposit that did not show up"
 004C      PRINT "on the bank statement."
 0066      PRINT
 0068
 0069      PRINT "Enter a zero when all your deposits have been entered."
 00A3      PRINT
 00A5
 00A6
 00A7      REPEAT
 00A9        INPUT "Amount of deposit? ",amount
 00C4        number_of_deposits:=number_of_deposits+1
 00CF        outstanding_deposits:=outstanding_deposits+amount
 00DB      UNTIL amount=0
 00E7      END
```

THESE FINE STORES CARRY THE RAINBOW

The retail stores listed below carry *the Rainbow* on a regular basis and may have other products of interest to Color Computer users. We suggest you patronize those in your area.

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	Booked Solid II
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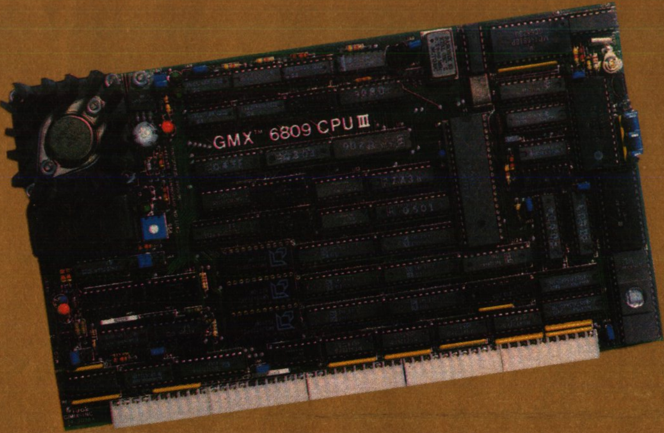

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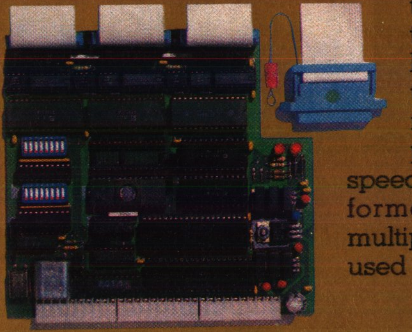

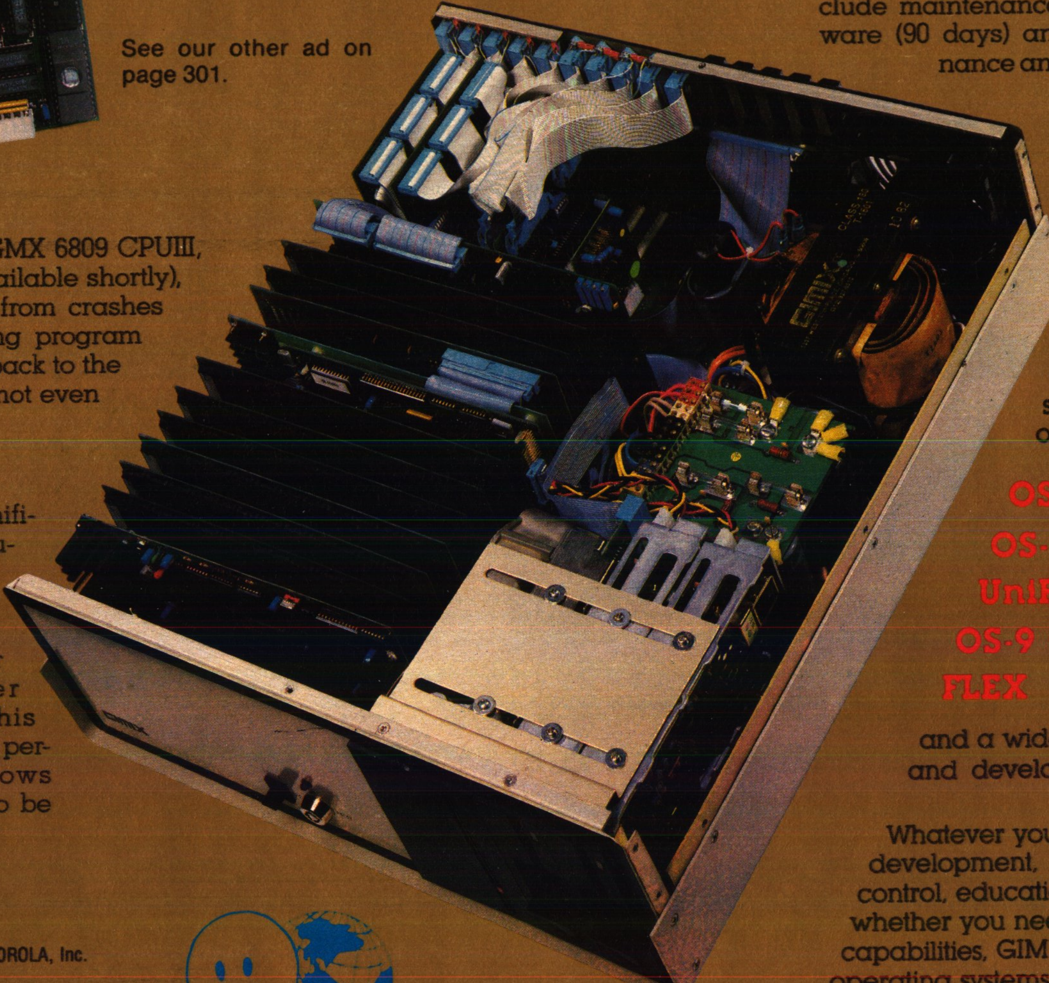

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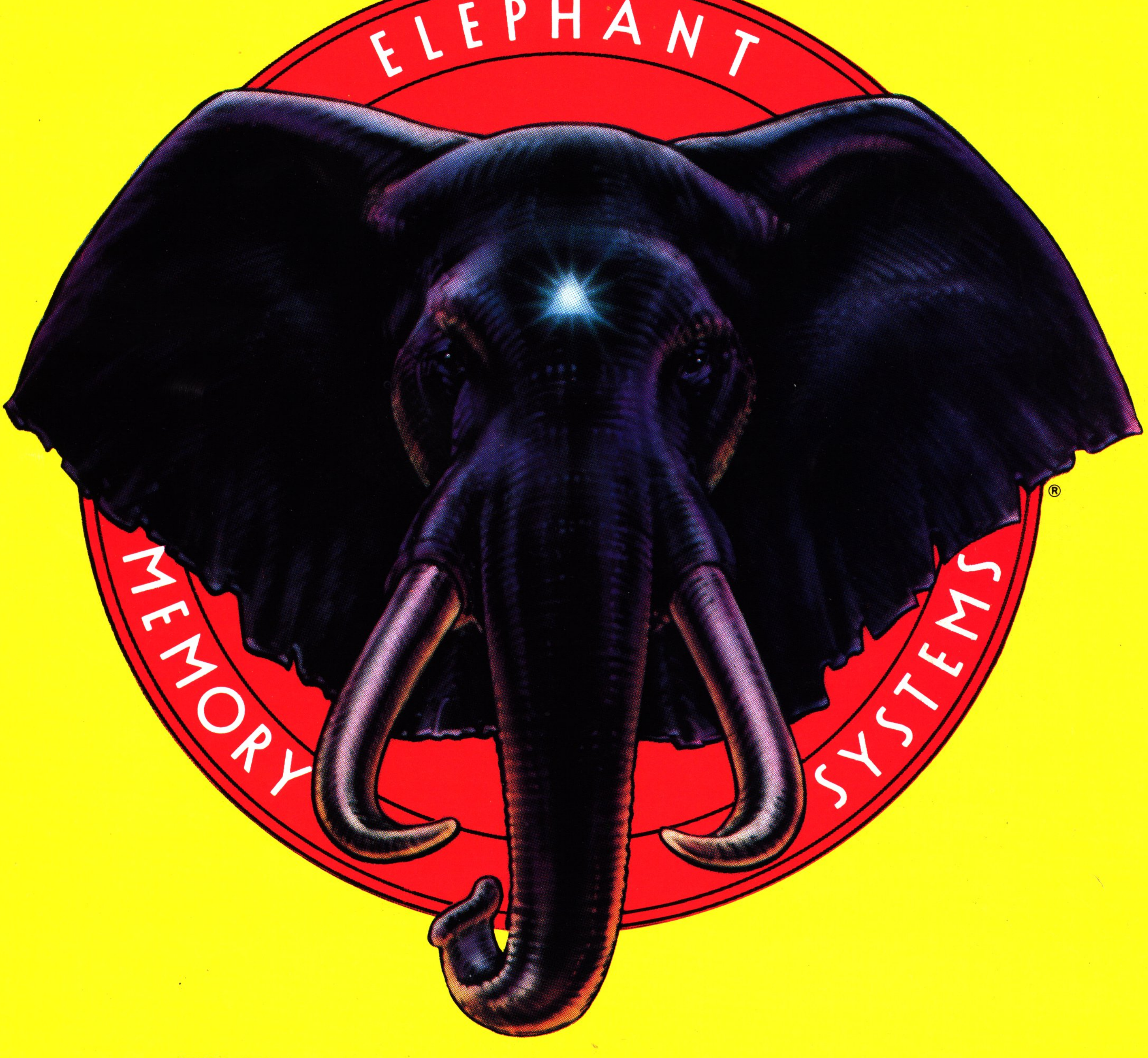

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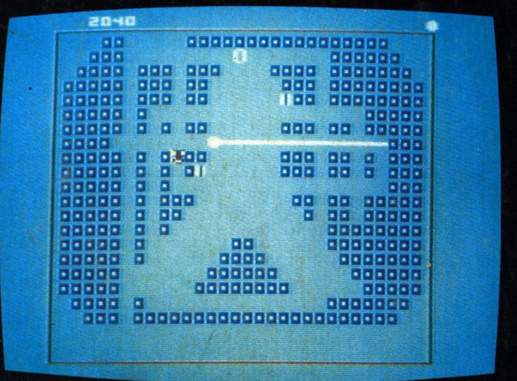

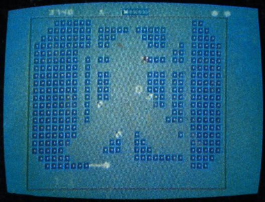

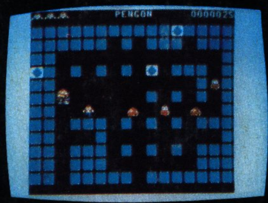
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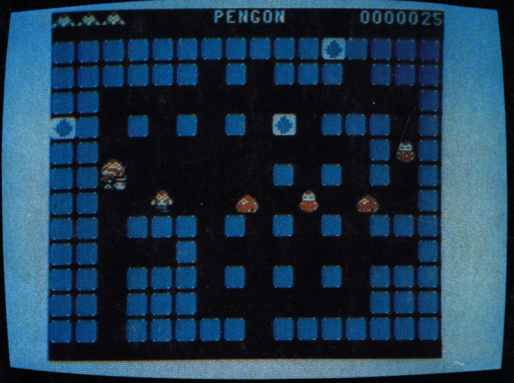
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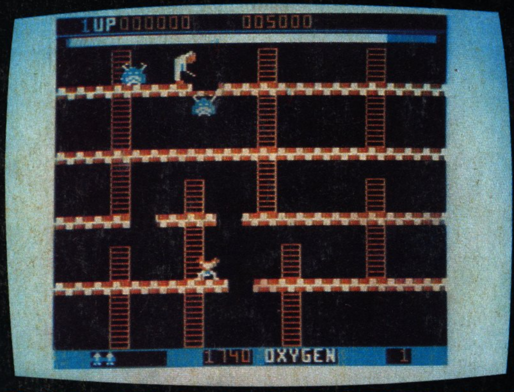
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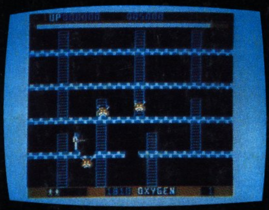

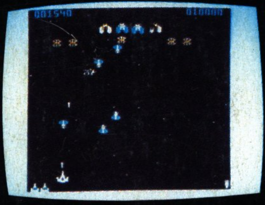
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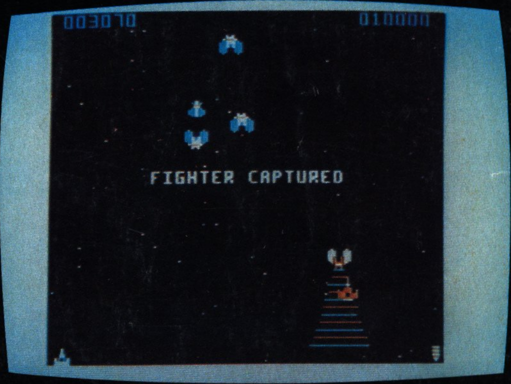
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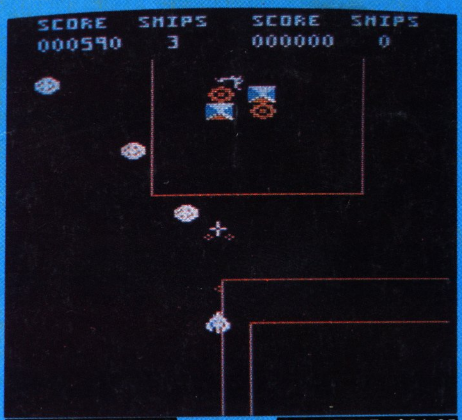
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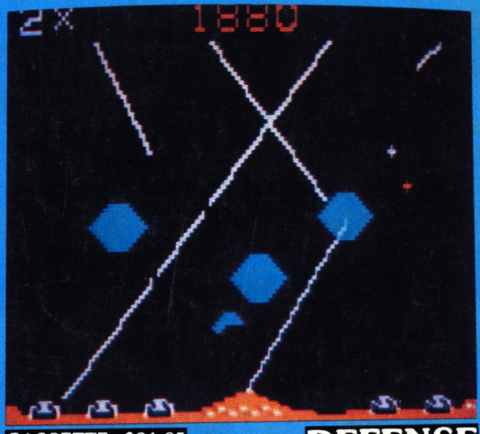

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